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PRESIDENT'S ADDRESS

NEW YORK SOCIETY OF ORTHODONTISTS*

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CONFORMING to a custom which must have some merit, since it is so universal, I come before you today to report upon the activities of the society during the past year and to make some comments and suggestions which may possibly be justified by my active participation in the affairs of the society during that time.

During the three years of the depression and this last year, when we hope and believe we are emerging from it, all elements of society, industry, business and the professions have been sorely tried to maintain their standards. This, perhaps, is especially true of the professions, since they operate upon well-established principles of long standing. The discouragement that comes from financial reverses and the reduction of income naturally tends to make the individual feel that some of the things which were regarded as important in the days before the depression have become relatively, at least, less so, and perhaps justifies him in devoting himself more closely to the material aspects of his work.

The attendance and interest manifested in a professional society or organization such as ours are perhaps a good index as to just how far we may have permitted the conditions which have existed in the last few years to divert our minds from the importance not only of adhering to present professional standards, but also of carrying on to even a higher plane of usefulness to the profession and to the public. Have we as individuals done our utmost in this direction? If we have, it should be reflected in the accomplishments of our society; and in reviewing the activities of the New York Society for the past year, it seems to me that its achievements justify the assertion that it has as a

*Meeting held April 9 and 10, 1934.

society maintained its standard in a manner which is in keeping with the efforts being put forth throughout the nation. There has been no abatement of interest in the meetings or in the work of the society, and the attendance has been almost, if not quite, as great as that in past years. The prompt payment of dues has maintained the financial status of the society in a manner which is far above the average. All this is matter for congratulation when one considers the precarious financial condition in which so many societies (dental and others) find themselves at the present time.

It is to be attributed, I think, to the fact that the New York Society, which covers a very large field, fulfills a genuine need. It not only does this but has had the good fortune from its founding until the present time to have men in New York and elsewhere who are genuinely interested in its welfare and are willing to devote any amount of time and work necessary for its advancement.

I speak from experience, for during the past year I have had the most whole-hearted, disinterested, and intelligent support and cooperation in the conduct of the affairs of the society. Perhaps, I should rather reverse this statement and say that I have tried to give my cooperation and support to the various committees, which really do most of the work, and to which the credit for the society's success is mainly due so far as the administrative side of that success is concerned. There is, however, another side to it, which is just as important, and that is the support which has been given by the membership as a whole through its attendance at and interest in the meetings and in the cheerful financial support through the payment of dues. I know of no society in which the members apparently take a keener interest in its affairs than do the members of this one, which seems ample assurance that there will always be good material from which to draw the important committees which govern its affairs.

The semiannual meeting held in November, 1933, not only was most enjoyable but was characterized by the same earnest attention to the program that has so encouraged the officers and committees in the past. I shall not take time to comment upon the various contributions at that time, as they are or soon will be available to the members for a second perusal through publication. Of the present program, I shall say only that the officers and committees left nothing undone to make it the equal of any in the past, and I feel confident that you will agree that their efforts have been successful in the highest degree. I do, however, wish to thank all those members of the society who have contributed to this meeting by appearing on the program and especially those who are not members who have been willing to take time from other duties to present matters of the deepest collateral interest to our society and to its members.

And now, may I call your attention to one or two matters which are of vital interest and importance to this society and, I may say, to all orthodontists. In the first place, the metropolitan district of which New York is the center is to be host at the next meeting of the American Society of Orthodontists, and I wish to bespeak on the part of all the members of this society, its officers, and the organization as a whole, the heartiest support for the meeting which is to be held here April 30 to May 3, inclusive, of next year. Dr. Leuman M. Waugh, one of our own members, is president this year of the American Society of

Orthodontists, which is as much as to say that so far as the presidency is concerned the meeting will be a success. If in addition he has the intelligent cooperation of all the experienced men in this section and the loyal cooperation of the members of the national organization (and I cannot doubt that he will), there can be no doubt that the 1935 meeting of the American Society of Orthodontists in New York will partake of the nature of an international orthodontic congress.

At this point I wish to say that we are sure the society would again wish to record its deep sense of loss in the passing from its membership through death, during the past year, of Dr. Martin Dewey, the man who has sometimes been called the stormy petrel of orthodontics, and, I may say, of the dental profession. His was a strong character, and though not always right he at least had the courage of his convictions, and it was stimulating to know him. Suitable resolutions upon his death have already been passed and recorded in our minutes.

Next, I desire to call your attention to a matter which has received comment by the officers of other societies, by the authors of a number of papers, and by the editors of several journals. I refer to the advertisements of dental laboratories, which not only offer their services to orthodontists for the construction of appliances, but also offer to advise them with regard to the manipulation of those appliances in the mouths of their patients. In short, they purport to give to the inexperienced orthodontist and the general practitioner expert advice with regard to the treatment of his cases. At its last meeting in November, this society passed a resolution discouraging the continuance of commercial, short term, orthodontic courses, as not being adequately equipped to give satisfactory instruction. If then, we believe that these schools cannot produce orthodontists properly equipped to treat cases, how shall we approve or fail to condemn the claims of those who advertise their capacity to give expert advice in orthodontia when their only training has been in laboratories maintained for the construction of appliances? It is a situation that may be productive of much harm to the public. Possibly it is one which may have been brought about, in part at least, by the rapidly increasing demand for orthodontic service and our present inadequate facilities for supplying this service. The solution is difficult and is bound up with the subject of universal health service, which is agitating the world so much today. It should be a warning to the best elements in the profession to be just as alert in looking to the welfare of the public as are the commercially minded in looking to their own welfare. This matter received attention at our last meeting through the election of a special committee to give it consideration during the interim and to report at this meeting.

Finally, I wish briefly to refer to a matter of much importance to this and all other orthodontic societies in the country. It is the contemplated reorganization of the American Society of Orthodontists. A representative committee has been appointed by the president, Dr. Leuman M. Waugh, to give the matter careful consideration and to make a report with such recommendations as they feel justified in making after a conscientious analysis of the whole situation. It has been suggested that if the American Society of Orthodontists would re-

organize along lines similar to the American Dental Association, many of the present difficulties with regard to membership and the overlapping of dues would be overcome. A more economical administration of the American Society, as well as of the district societies, would be possible were they to become, as has been suggested, component societies of the American Society as a national parent body. It is my desire to get the consensus of opinion of the members of the New York Society, and I trust that opportunity for some expression of opinion by the members will be found during this meeting. While it would be out of place for me to discuss this proposition fully or to make argument for or against it here, I think I may properly say that many with whom I have talked have felt that their interests as orthodontists could be better served by the much stronger organization which could be built up and that in turn they could undoubtedly serve the society and their profession more effectively.

In closing I wish to express my high appreciation of the honor conferred in making me your presiding officer for the past year. The duties have not been very arduous and have been performed with genuine pleasure because of the whole-hearted cooperation of all of the committees and the other officers of the society, not to mention the warm support accorded by the entire membership. I was promised this support and cooperation at the time of my election, and it has been more than fulfilled. I wish again to express my deep thanks to the contributors to our program, to the members, to the officers and members of the various committees and to the management of this hotel, which has given us such courteous and efficient service.

PRESIDENT'S ADDRESS

EASTERN ASSOCIATION OF GRADUATES OF THE ANGLE SCHOOL OF ORTHODONTIA*

WILLIAM J. SPEERS, D.M.D., BOSTON, MASS.

THIS being the annual meeting of our Society, it becomes the duty and privilege of the president to express himself in matters pertaining to the organization. This I shall do very briefly.

It is an honor to have been chosen the presiding officer of this, one of the oldest orthodontic societies in the world, and I wish to express my sincere appreciation to the members for this honor; also to express my gratitude to the officers for their loyal support, for they have done most of the work. To Dr. Ferris do I especially extend my thanks.

It seemed wise to curtail the number of meetings this year because of the continuance of the so-called depression, but I hope by concentrating on this one meeting it will prove to be especially profitable.

The birth of this society dates back to January 18, 1907, at a meeting held in the office of Dr. Frederick L. Stanton in New York City, when a few men assembled for a study club. The outcome of that meeting again demonstrates the value of the small group study club in which all are vitally interested in one objective, and the study club cannot be too strongly recommended, especially to the younger men.

The permanent organization took form at the office of Dr. Frank A. Gough in Brooklyn, in June, 1909, with a charter membership of fifteen.

We have just reason to be proud of our Society, for though it never has been large in numbers, we have included in our membership men who have been leaders in the field of research, as well as those who have developed the mechanical phase of orthodontia to a very high degree.

Many of our finest meetings have been built around papers presented by our own members, who have shown a spirit of sincere devotion to orthodontic research and service.

In order to maintain this high standard it will be necessary for all our members to cooperate by giving their enthusiastic individual support in the preparation of the meetings and thereby give the incoming president the encouragement which is needed.

This cooperative spirit is keenly needed, because the membership is becoming more limited and never can be otherwise under our present organization.

A few years ago there was some discussion as to the advisability of increasing the membership, which could only be accomplished by accepting those who were not Angle graduates. My own inclination would be to preserve the iden-

*Twenty-Fifth Annual Meeting held in New York City, May 7, 8, 1934.

tity of the organization as a group of Angle graduates so long as it is feasible, recognizing fully the impossibility of reconciling that with any increase or even static maintenance of membership, and compensating for lack of size by intensity of interest.

It is with that thought in mind that we have this year made an effort to devise a program of special interest and benefit, and to stimulate in the members and their guests a realization of the unique privileges our organization affords.

To lose the essential identity by any change in the membership requirements would appear to me to be unfortunate. There is an ample number of orthodontic societies, but there is and can be only one Eastern Association of Angle Graduates.

This fact coupled with the Society's attainments amply justifies the continuation of the Society's existence with renewed enthusiasm.

I wish to express myself in support of the American Board of Orthodontia, for I feel that its activities are a decided step in the advancement of the higher standards of our specialty. The men who took the initiative in instituting the Board have done so at a great sacrifice of time and energy and deserve our commendation and support, and I would strongly urge more of our members to make application themselves and to encourage the younger men of our ranks to do so. Unfortunately some practitioners long in practice argue that they will receive no personal benefit through membership, forgetting the helpful influence to the Board through their endorsement and membership.

The requirements by the Board may appear by some to be exacting, but to the progressive mind it should encourage reading and research in the preparation of the required thesis, thus raising the individual standard, which is most desirable.

Orthodontia as a specialty, though young in terms of years, has made rapid progress, and during that advance in this country many sectional societies have been inaugurated.

Recently considerable thought has been given to the advisability of making the sectional societies component parts of the American Society of Orthodontists.

There are many advantages to be obtained by such a union, including a better coordination in arranging plans and dates of meetings.

Membership problems if taken care of by the district society should be dealt with more equitably to the applicant and with a saving of time to the parent organization.

The parent body could serve as a clearing house for any problems of an educational or political nature. It has also been suggested that the *INTERNATIONAL JOURNAL OF ORTHODONTIA AND DENTISTRY FOR CHILDREN* could be procured for the members at a considerable saving, as a result of the increased number and the regularity of subscriptions.

Another advantage to be obtained would be that the best papers and clinics given at district meetings could be chosen for the American Society meetings and vice versa.

I therefore recommend that this body take action which would express our sentiments in favor of correlating the interests of the several district societies with the American Society of Orthodontists.

I understand the New York Society of Orthodontists at its recent meeting passed a resolution expressing favor of such a combination.

In union of numbers there is strength, provided the organization has a common purpose, which in our case should be an elevation of professional and educational standards, thereby placing orthodontia in that enviable position of rendering the very best health service.

It has been said that "professional groups are notorious in history for having been singularly backward in furthering their selfish interests." This statement can hardly be denied when contrasted with the labor groups, but are we to surrender the ideals that mark the line of demarcation between the professional man and the artisan? I think not.

In the Scriptures we find the statement that "the servant is worthy of his hire," and as members of the healing art we are servants of the people, but as such are deserving of a fair compensation for honest service well rendered.

For the past four years most human activities have had their trying times, and although we frequently hear that "better times are just around the corner," to many the road leading to that corner has been long and rough.

Far be it for an orthodontist to invade the field of the economist. I do not propose to chart our economic future, but there are reasonable assurances that improvement in general conditions is under way and is likely to continue. Since professional men, and orthodontists with the rest, were later in feeling the pinch, it is only reasonable to expect that they will be later in experiencing better conditions.

I should like to dwell just a few moments on the significance for our profession of the low swing in the economic cycle.

Wage earners who have suffered with ill-grace some ten and twenty per cent reduction in income, fail to realize that professional men with overhead expenses that can be only slightly reduced, and the combined drag of reduced practice, smaller fees, and poor collections, have faced forty, fifty and sixty per cent reductions in net income. Of course, these times have been hard for us, and some cannot see much in which to find encouragement. I believe there are several compensations and bases of optimism.

In the first place, I believe most of us have wisely maintained good will by carrying worthy patients at much reduced fees, and being reasonably lenient in the matter of payments with those who are really deserving and struggling. The result of this can only be an increased volume of practice when money is again flowing more freely. And though we naturally will expect larger fees then, I incline to a belief that the average level of fees will in many instances be kept substantially below those we were accustomed to consider minimum at one time, thereby bringing competent orthodontic treatment within the reach of many more than was formerly the case, and this without sacrifice of material reward on our part, because of the increased volume of practice.

The second major benefit to be found in our adversities is the opportunity for study and improvement of technic and standard of service that has gone with the leisure that was forced upon us.

Most men have had time for reading, writing, and studying to an extent they never experienced in so-called good years, and those who have been keen to grasp that opportunity will reap personal dividends as well as contribute to a general raising of our professional standards. It is unfortunate that reduced association and personal budgets have prevented a large increase in the number of formal meetings in which more of that free time could be devoted to the wider exchange of ideas that would thereby be permitted.

As I bring these random remarks to a close, I am tempted to abandon my already expressed resolve and to risk the label that is the lot of those who "rush in where angels fear to tread." I will prophesy the future—that it will be exceedingly bright for each of us individually, for our association, and for our profession.

THE ETIOLOGY OF DENTAL ANOMALIES

B. E. LISCHER, D.M.D., St. Louis, Mo.

USUAL OPINIONS OF CAUSES

CONTEMPORARIES of Fauchard, who read and applied his elementary recommendations for correcting malposition of the teeth, did not realize that they were attending the birth of orthodontics. Dentists of his period practiced the art of treating anomalies as an extension of mechanical dentistry and, apparently, were satisfied simply to improve the terminal malformations which they had learned to recognize. Since it has become the purpose of dental orthopedics to prevent, as well as correct, dental anomalies, our knowledge of such deformities must include comprehensive understanding of their pathogenesis. Many practitioners have, of course, attempted to collect adequate data which would advance our knowledge of the origin of anomalies, but its present status is far from satisfactory. While we may modestly claim progress in this difficult division of our field, our science is still too barren to enable us to achieve our purpose adequately.

Contributors to this subject usually adopt one of two prevalent opinions of the causes of anomalies, and one of two popular methods of classifying causative factors. In doing so, they seem indifferent to established facts, and they accept assumptions which are untenable.

The first group believes that anomalies are frequently inherited and causes are thus classified into two classes, *hereditary* and *acquired*. Doubtless many of you can recall the time when heredity explained many otherwise unexplainable phenomena, when many diseases and deformities were believed to have been transmitted from generation to generation. In those days heredity was, in fact, an entity, a force, and probably more frequently for ill than for good. But the rapid progress of biology during the last fifty years has compelled us to change our views on the subject. Hence we no longer "spell heredity with a capital 'H'; we no longer think of it as a power or as a principle, as a fate or as one of the *forces* of nature; we study it as a genetic relation of resemblances and differences which can be measured and weighed, or in some way computed." In other words, we now know for a fact that the nuclei of the germ cells are the bearers of heredity, that "after the moment of conception the gates of heredity are forever closed"; that the germ plasm possesses a continuity not true of somatic cells; and that, owing to its relative apartness from the everyday metabolism of the body, acquired modifications are not transmitted.

The second group earnestly denies the potency of heredity, and not infrequently its members feel obliged vigorously to defend the adequacy of environmental factors. Accordingly, most cases of malocclusion are due to *local* causes; it is assumed that the relatively few cases which cannot be attributed to adven-

titious influences are of *constitutional* origin. Twenty-five years ago this latter group attempted to popularize their prepossessions by using the senseless slogan: "Nature never transmits the abnormal." Unfortunately, nature, nevertheless, seems unconcerned and continues to transmit good or ill with equal indifference. Indeed, a noteworthy conclusion of contemporary genetics is that "Morbid hereditary equipments are transmitted with the same laws as normal ones."

Another common mistake of dental writers has been a hasty use of generalization, as though it were permissible and inconsequential to derive a general concept from a limited number of particular facts. They seem not to realize that generalization is one of the most difficult tasks of science. Because it is impossible to study heredity in man by experimental breeding, our generalizations must be based on analogies drawn from experiments with lower animals and plants, and on critical analysis of the conformation of hereditary human trends. This means that the problems which the etiology of dental anomalies present for study and investigation are far more difficult than our discussions generally concede.

Although few subjects are more important to the future of orthodontics than is the etiology of anomalies, a review of our literature reveals that a wide disagreement among orthodontists still prevails, and that much that has been written is saturated with prejudice and ignorance. It is doubtful, too, whether those who continue to use obsolete terms and faulty classifications of causative factors have any notion of how useless these are in explaining our difficulties. The same condition existed twenty-five years ago, when I first adopted terms that I believed to be more appropriate for the classification of causes, terms which do not involve one in assumptions, namely, the *extrinsic* and *intrinsic*.

An extrinsic factor is one which is not of the body, which comes from without and is accidental or acquired. Such a cause cannot possibly be inherited; when it is congenital, i.e., operative before birth—which happens rarely—it is acquired in utero. An intrinsic factor, on the other hand, is one which belongs to the body, is not incidental or acquired and may or may not be inherited. Such inherent influences are not easily recognized, for they "concern the internal structures of organs and of minute tissue elements, the cells."

THE KNOWN CAUSATIVE FACTORS

Part of our progress in explaining the causes of anomalies has been gained by recognizing the effect of extrinsic factors, that is, conditions which the practitioner may observe and at times even remove. But the list of these factors is often too comprehensive. Thus, the *premature loss of teeth* is widely accepted as a cause and usually placed in this group, notwithstanding that it is not always due to extraction, accidents, marked loss of function, or other undeniable extraneous factors. Perhaps we have too long regarded teeth as things apart from the body and underestimated the significance of their relations to the organism as a whole. At all events, we are learning to realize that when early loss of teeth is due to caries—even if only parts of their crowns are destroyed by caries—it may be the result of systemic disease.

Retention of deciduous teeth beyond the period of their need is acknowledged as a cause of malposition of permanent ones, and clinical observations

compel the conclusion that it occurs more frequently when they show considerable wear of occlusal surfaces. But this wearing away of deciduous teeth is seldom due to vigorous mastication; most of it results from gritting the teeth during sleep. The latter is probably induced by dryness of the mouth associated with the mouth-breathing of nasal obstruction.

Nasal obstruction has been on the accepted list of extrinsic causes for several decades. In Chapter IV of Lambert Lack's *Diseases of the Nose* (1906), the more important direct effects of nasal obstruction were enumerated as follows: Loss of nasal function, the open mouth and its mechanical consequences, collapse of the alae nasi, deficient oxygenation of the blood, and deformity of the chest walls. Frequent, outstanding complications which concern the orthodontist he designated as the typical facies, malposition of the teeth, and malformations of the jaws. His conclusions were stated as follows:

"Thus, most observers agree that the deformities in question are frequently, if not invariably, associated with mouth-breathing. Ziem's experiments (1888) demonstrate conclusively that they may result from it. He obstructed the nostrils of puppies and other young animals, and found that great deformity of the bones of the face resulted in later life. There seems every reason to believe that nasal obstruction precedes and causes the facial deformity. The latter is never congenital, but it follows after years of mouth-breathing; the changes can be arrested, and will even retrogress, if the cause be removed."

In a recent discussion of hereditary diatheses (susceptibilities), Dr. Fritz Lenz says: "Children suffering from adenoids breathe mainly through the mouth, and this is supposed to make the upper jawbone narrow and the palatal arch narrow and pointed. To some extent, however, the connexion may be differently interpreted. We may well suppose the narrowness of the palate to be a direct expression of hereditarily determined narrowness of the upper jawbones upon which the narrowness of the nasopharyngeal space likewise depends. . . . My own experience enables me to publish here a genealogical tree showing the family incidence of the adenoid constitution for four generations."*

For many years various *habits* of infancy and childhood have been regarded as fruitful causes of malocclusion of the teeth. For example, *thumb-sucking*, which is very common, is generally acquired during the first few weeks of with which growing bones are molded into form by function, and on the infancy. When we reflect on the mechanism of jaw development, on the easiness of such a habit, it seems reasonable to accept it as a cause. Recent investigations by Stallard have shown that previously unsuspected habits of children may cause various malformations of the jaws. Nevertheless, several medical writers, during the last decade, have questioned their potency because many children addicted to such habits over years of time escape the ill effects attributed to them.

Traumatic injuries may cause fractures of the dental structures and result in malocclusion of the teeth if corrective treatment is not provided. Numerous authentic cases have been reported which unquestionably establish that accidents may produce oral deformities.

*From Bauer, Fischer and Lenz: *Human Heredity*, 1931, pp. 330, 331, by permission of The Macmillan Company, publishers.

Chronic affections like certain forms of *paradontosis* may also cause malposition of teeth. However, this factor is generally operative only in adult life and accounts merely for minor deviations and for aggravations of preexistent anomalies.

Extensive caries of the deciduous teeth frequently leads to pulp exposure and subsequent infections of the jaws which retard development of the latter and cause consequent crowding of the permanent teeth. *Dietary deficiencies* are now suggested as a contributing cause of such rapid decay.

A considerable number of dental anomalies are undoubtedly due to certain inherent influences. For example, *anomalies of number*, which are readily recognized, frequently cause deviations of alignment and occlusion of the adjacent teeth. When more than twenty teeth appear in the deciduous dentition, or more than thirty-two in the permanent, we term it *redundancy* of number, or *supernumerary* teeth. This generally leads to a crowded arrangement of the regular teeth. Although supernumerary teeth are usually of abnormal form, that is, either conical or of extreme atypical form, in rare instances they have been found to conform to correct anatomic contour or configuration. Examples of the latter kind are known as *supplemental* teeth, which may assume positions of alignment.

When less than the accepted number develop, that is, when one or more teeth are congenitally missing, we call it *deficiency* of number. This condition permits the adjacent teeth to migrate into abnormal positions. Deficiency of number may vary from one tooth to several or all the teeth. Instances of the latter variety have, in fact, been recorded. It is obvious that such anomalies are not due to extraneous causes, and numerous contributors have recorded cases in which hereditary trends through several generations were evident.

Although rare, anomalies of *form* of individual teeth may cause a malocclusion. They may manifest themselves in either deficiency or redundancy of form, or as a fusion of two teeth; and in the anterior parts of the dental arches they may cause extreme malformations. Deficiencies of form, such as a simple, cone-shaped lateral incisor, permit a separation and migration of adjoining teeth. Such anomalies may also involve the entire tooth, i.e., *complete* anomalies of form; or they may disclose only a *partial* malformation of either crown or root.

The labial frena are known to be highly developed during the last stages of embryonic life and the early weeks of infancy. As the period of tooth eruption approaches, developmental changes bring about alterations and diminutions. In rare instances, reduction in size and a change of form do not follow, which prevents proximal contact of the median incisors. Clinical observations show that the *hypertrophy* of the *frenum labium* is congenital, that it affects the deciduous teeth as well as the permanent teeth. In my collection of 1,600 cases of oral deformity, 195 presented hypertrophy of the frenum in the maxilla and 5 in the mandible. Recently, I have observed this condition in both the maxillary and the mandibular arches of the deciduous denture of a girl aged five years.

Congenital *cleft of the palate* usually causes extreme deformity of the denture, and Bland Sutton long ago contended that such anomalies may be inherited.

Extreme *anomalies of position* of the individual teeth, e.g., *perversions* and *transversions*, cannot be traced to environmental factors; their origin may be due to an error of development which, while not directly perceivable, may lead back to a defect in the fertilized ovum from which the individual is derived. Malformations need not be visible at birth; their beginning at any particular moment of time is not easily established. Although the causes of these anomalies are unknown, they, obviously, are intrinsic.

Asymmetry of the jaws (which Talbot estimated occurred in about 30 per cent of apparently normal individuals) and *anomalies of the tongue* are believed to cause a considerable number of malformed dentures. *Rickets* and *endocrine dysfunction* are also believed to be causative factors of these developmental defects.

THE NATURE OF DENTAL ANOMALIES

Variation is a basic condition of all organic forms; hence no two dentures are equivalent in their dimensions or alike in many details of their symmetry and proportions. Naturally, such deviations are generally disregarded, for their wide occurrence has confirmed the conviction that variations are of germinal origin, that they portray a way of life.

In describing organic structures the usual, or regular, form is termed the type, which serves as a model which all other members of the group resemble more or less closely. In former times, the type was a perfect or universal idea which existed in the creator's mind, an imminent teleologic principle. The great naturalist, Agassiz, made type a divine thought. In the science of today, type is accepted as a chosen representative of a species, i.e., a man-selected specimen. In systematic botany and zoology, for example, type means an individual example upon which the description of a species is based. This modern idea is essentially statistical and was first established by the Belgian anthropologist, Quételet. Thus, it is a concrete embodiment, or exemplification, of a chosen characteristic quality or of numerous qualities.

Anomalies are defined as deviations from this usual, or regular, such as irregularity of structure, form, or function. They are usually more extreme than variations and are abrupt, asymmetrical departures from our accepted standards. They are also regarded as pathologic and may be said to constitute permanent deviations from a state of perfect adaptation.

Our accepted standards of the normal with which we evaluate dental anomalies have undergone a very radical change since biology and its lusty offspring, biometry, have investigated the significance of variations. In the first stages of science, principles and conclusions are usually qualitative, that is, they are anatomic, which means an analysis of structural parts. As our studies become more extensive, principles and conclusions are based on a larger material and they become more quantitative, that is, biometric. This has compelled us to conclude that there can be no "generic conception of the normal, because such does not exist. The concept of the normal, so far as the individual human being is concerned, represents a pure abstraction. It is a prejudice to suppose that a distinct normal type must exist." In other words, there are no great, fixed, "revealed" patterns, by which we can judge deviations.

Early investigators were content to recognize extreme malpositions of individual teeth, which they termed *irregularities*. Later contributors changed the phrase to *malocclusion* of the teeth and included descriptions of perverted occlusal contacts, of arch malrelations and other deviations. Now, it is very seldom that only one tooth is malposed in a given denture; usually several teeth and their supporting alveolar process are involved in an anomaly. Not infrequently the entire denture presents anomalous relations, though the several parts may be variously affected. In still other instances the bony structures of the jaws and the conformation of external facial features may be deformed. (This fact has been recognized for some time, but widely accepted diagnostic classifications continue to ignore it.) It may also happen that certain parts of a denture are anatomically correct in form, in development, and in cephalometric relations, while other parts are anomalous. Lastly, some anomalies are symmetrical and bilateral, others are asymmetrical and unilateral; many of them are extremely complicated deformities, and it is becoming very obvious that the widely used phrase "malocclusion of the teeth" does not adequately express our present understanding of them. All the structural parts of a human denture, e.g., the teeth, dental arches, alveolar processes, and the supporting jaws, plus several of the external facial features may be involved in given cases of dentofacial deformities, and the various individual deviations may mingle in an endless variety of combinations. Many anomalies are not unlike diseases in this respect; their complexity is exemplified in a very large number of instances.

CAUSES IN THE LIGHT OF MODERN SCIENCE

Although the dictionary simply defines cause as "that which produces an effect," the idea of it dates back 2,300 years to Aristotle. The concept of causation was recognized in the philosophy of ancient Greece before medical science was born, and numerous classifications of causes to promote clarity of understanding have been proposed through the intervening centuries. The philosopher, Kant, placed causality in his list of categories or fundamental conceptions, and Bertrand Russell has but recently reminded us that "causation is deeply imbedded in language and common sense." He also shows that "as a matter of fact the world is incredibly more complicated than it seems to common sense," and that "when we look for invariable rules of sequence in nature, we find that they are not such as common sense sets up."

In his *The Norm-Concept in Orthodontics*, Simon comments on cause as follows: "But what is a cause? We must understand this concept very clearly if we would understand etiology. After all, every cause results from a preceding cause, and these lengthen into a chain of causality, which, scientifically, has neither a beginning nor an end. Its links serve both as cause and as effect and, according to Goethe, constitute an indivisible phenomenon. To select a link from this chain of causality as a 'cause' is a fiction, that may be necessary and practical in order to comprehend a section of the endless chain; but this cannot be established empirically, because it does not exist in objective reality."

It is obvious that few conditions arise from a single cause. This has prompted the development of Verworn's theory of knowledge, known as *conditionism*. Accordingly, we "apply conditions to every cause, because in every

instance several, yes many, components are contained." The complicated nature of many dental anomalies foretells the involved character of our theme. Our everyday insight which gave rise to the problems of etiology cannot solve them; clinical experience and observations will not suffice. Only carefully planned experiments on lower animals can yield the principles by which we may ultimately interpret the phenomena observed in our patients. And our case histories of the latter must be designed for the gathering of genealogic and statistical data which will help in the solution of our problems; they must include much more than the practical items of our therapy if we would extend the boundaries of our knowledge.

DISCUSSION

Dr. A. H. Suggett.—I think the greatest compliment that I can pay this paper is not to discuss it. I think it is a magnificent paper, but it is no more than I expected from Lischer after three and a half years' training on the Pacific Coast.

We were very much disappointed that we had to lose him in California, but a call back to his old home in St. Louis was too urgent. He had a very magnificent set-up there, and a wonderful plan of cooperation with the medical department, so that we feel there is opportunity there for help in all the lines of the profession, very much better than on the Pacific Coast. He is nearer to the center of things there, and my prediction is that his influence along educational lines will extend and broaden as the years pass.

I think that one of his finest features is his open-mindedness. You will remember that years ago he was on the Committee on Nomenclature for the American Society of Orthodontists, and I happened to be with him on it with Ottolengui and others. We tried to profit a little from the reflected glory, but he did the work. He worked out a system of nomenclature and presented the Latin terminology, and it was accepted by the American Society of Orthodontists. Just about the time we had begun to settle down on that and had accepted it, gnathostatics appeared on the horizon and he felt that it was better, and although he had written a book on his theory, he did not spend the rest of his life, as a great many good men have done, defending it. So many men write books, and then think they forever have to defend the theories therein. However, Lischer was the first man to say that there was an improvement in this over his, and he has never been corrupted by having to defend something he had written about. As I say, with his open mind he is willing to scrap anything he believes today if tomorrow you show him something better. That is a state of mind which is pretty hard for most of us to acquire. To write a book is a pretty dangerous function. I know of some very able men who have been impeded the rest of their lives by doing it, for they think anything that is said contrary to what they have printed is a reflection on their views, and that because they believed something twenty-five years ago they must still believe it today. In practically every line, including orthodontics, what we are teaching today will perhaps be a joke in five or ten years from now; so if we see there is a step forward that we can take, it is our duty to take it, but with the reservation that it is not the last word.

We ought to be warned that orthodontics is very new. It is perhaps one of the latest of the specialties to come into use; so how can we feel that after only about thirty or thirty-five years we have arrived at finality? That is something more than I can understand, yet a great many of us feel that we have arrived at the end and that there is nothing more to be said. I remember a very eminent man saying that the Dee band and expansion arch was a perfect instrument and could not be improved upon, so do not try.

Dr. M. F. Ashley-Montagu.—Not being an orthodontist, but an anthropologist, I rather hesitate to rise at a meeting of orthodontists. It is very gratifying to find that anthropologists are now no longer regarding orthodontists as congenital tooth-straighteners but as individuals who are attempting to broaden their outlook and to take notice of the most recent

developments in other fields of relevant knowledge, developments which may be of assistance to them in their practical work in the cure and prevention of disorders in position and relation of the teeth and their associated structures.

Dr. Lischer is known to me through his translation of Simon's book, which I recently had occasion to criticize, *not* the translation of the book—which I thought was excellent—but the views contained in the book itself. As an anthropologist it is impossible for me to accept Simon's views, even upon the basis of a questionable theory of fictions. Hans Vaihinger's great book, *The Philosophy of "As-If,"* is an extremely important and interesting philosophical treatise, conceived by a young man not yet twenty years old and executed by him in the summer of his life when he had relinquished his duties as a professional philosopher. Vaihinger's description of the theory of fictions is extremely interesting to philosophers of science, and every one, of course, admits the value of fictions in practice, but there are fictions and fictions, just as there are categories and categories; the categories of Kant mentioned by Dr. Lischer were rejected by all philosophers who came after him. Aristotle's ten categories still hold the field where Kant's four were rejected.

Now, to select as Simon does a point such as the orbitalia and another inferiorly on the apex of the canine tooth, and to try to establish an average or type relationship between them, to which the disordered position of the teeth might be adjusted, seems to me a highly questionable procedure.

There is no evidence at all available that such a relationship exists, and Simon himself admits that this relationship is merely a fiction, but he goes on to say that it is a fiction which *works* in practice and is therefore justified, since it does achieve some good. But does it?

Investigations so far carried out by anatomists and anthropologists demonstrate that such a relationship does not even approximate to an average one, and that the fiction, therefore, loses some, at least, of its value. Not only this, I do not think that it is a proper experimental or even philosophic approach to the subject to attempt to adjust teeth to such a type relationship when the experimental evidence that we have does not at all suggest that improvements will result from such movements of teeth. What it is necessary for biologists to recognize, whether they are odontologists or not, is that the human organism is an organism characterized beyond anything else by the infinite number of variations which may affect its particular structures. This variation must be accounted for, and I think Dr. Lischer's admirable presentation of one side of the problem is not the whole story. There is now available an enormous amount of evidence to show that the position of the teeth and their associated structures, malocclusion or what-not, is to the largest extent brought about by hereditary factors; in other words, that the problem is really a genetic one. The odontologist is perfectly stumped when he is presented with the task of analyzing the nature of the genetic factors responsible for any particular condition. The combinations of these factors are infinite, and, in fact, he can never hope to solve them. He can never hope to demonstrate the etiology of malocclusion. All he can hope to do in any particular case is to be able to say that here is a particular type of disorder which may be amenable to a certain type of treatment, and, as I see it, the future work of the odontologist lies in the adjustment of a type of treatment to a type of disorders. Now, the work of Dr. Detlefsen of Philadelphia has been carried out mainly with this point of view. He has demonstrated by the analysis of a large series of twins, I think 160 pairs, that the environmental factor is a minimum factor in the etiology of malocclusion, that the environmental factor can be discarded from all theoretical discussion thereon, but not from the practical discussion. Such purely mechanical factors as thumb-sucking, and certain tongue and lip habits may be easily recognized and the proper treatment, of course, prescribed. However, for hereditarily determined cases, there is very little you can do to alter the genetic structure which has been responsible for the production of the disorder, so that when Dr. Lischer emphasizes the important part that heredity plays in the determination of these disorders, he is merely confirming facts already established. Apropos of Dr. Detlefsen to whom I previously referred, may I say that he has impressed me as an individual eminently equipped to tackle this problem. By his biometric analysis of 160 pairs of twins he has carefully established that the environmental factor plays the least considerable part in the determination of mal-

occlusion, and that it is the genetic factor which is most significantly correlated with the conditions thus designated. If orthodontia will recognize that it is for the most part dealing with a genetically determined disorder and not with environmentally determined one, I think that the path for future development will have been greatly cleared, and I think I ought to add, in conclusion, that I consider Dr. Lischer has done a great deal toward the clearing of that path.

Dr. Jacobson.—Relating to what Dr. Ashley-Montagu has just said in the discussion of this paper, Dr. Detlefsen is in the room, and I think it would be to our benefit to hear from him.

Dr. J. A. Detlefsen.—It was quite by accident that chance brought me here to enjoy these meetings, and I had rather hoped to indulge in passively listening to these contributions, all of which will eventually lead to incisive thinking, clear concept, and logical approach in clinical orthodontia, but I had hardly anticipated discussing a paper.

Amplifying Dr. Ashley-Montagu's remarks relative to my previous report on etiology (since I did not hear all of Dr. Lischer's paper), certain thoughts suggest themselves. While no one should presume to give any complete discussion of such broad and deep subjects in the space of a few minutes, nevertheless a few comments may be attempted even at the risk of being misunderstood.

Every intelligent observer is perfectly familiar with the simple fact that man is a very variable animal. Measurements demonstrate it conclusively for every attribute or condition in the human body, including all those elements or components which when integrated make up, among other things, the dentofacial complex with its peculiarities of occlusion. Every individual has either a satisfactory or more or less unsatisfactory occlusion, regardless of whether the point of reference is the average, mode, or median, or any preconceived standard based on curves, occlusal contacts, arbitrary planes, or esthetic ideals. Whatever he has is only the result of a long sequence of antecedent growth and developmental processes, which in turn were determined by heredity and a sequence of environmental conditions. Clinical orthodontia is essentially concerned with the amount of variation by which the individual patient deviates from our concept of what should constitute his satisfactory condition, or so-called individual normal, when his dentofacial equipment indicates that a more satisfactory arrangement of structures and functions might perhaps have been or is possible under other conditions of development.

We *naturally* ask the meaning of those convenient expressions "normal," what is "more satisfactory arrangement," what are "the conditions of development," etc. The terms, "perfect," "ideal," "normal," "natural," and "average," as applied to occlusion and every other condition, have led to endless confusion. "Perfect," "ideal," and "esthetically correct" depend largely on the personal predilections of the individual judge or diagnostician. "Normal," "natural," and "average" have been used interchangeably. In a broad and yet very real sense, everything is natural even malocclusion, in the fact that all things are determined by this particular order of existence in which we live. The arithmetical average for a given race, stock, sex, or age is useful because it is easily determined and understood; but when we speak of normal occlusion, we cannot necessarily imply that "normal" is synonymous with "average," inasmuch as the average condition may be unsatisfactory, while "normal" usually implies healthy and functionally satisfactory. For example in 621 eighth-grade white school children 360 first permanent molars had been extracted, and the remaining 2,124 molars showed 1,965 carious cavities. This gave an average of 3.16 cavities and 3.42 molars present per child, which averages are neither ideal nor satisfactory and hardly normal in the sense we usually mean to convey by this term. Also, obviously not a single child represented the exact average conditions of cavities or molars present. The term, "average," is used so frequently in orthodontic literature that its meaning and implications should be clearly understood. Its purpose is to furnish a quantitative value intermediate to a number of objects or qualities which value shall be representative of the group. There are several kinds of averages in common use, the commonest being the arithmetic mean (frequently called simply the mean or average), the mode (most frequent class in an ideal fitted frequency curve), and median (the middle item in an array). To these may be added the geometric and harmonic means.

Which form of average we shall use depends altogether on the relations between the things we are considering, and what we intend to convey. Frequently we say "average" when we really imply "mode," as for example when we say the average child has three cavities.

There is nothing sacrosanct about an average, and frequently no individual in a group even shows the average condition. It is merely the result of an arithmetical process, useful in group comparisons, has certain mathematical advantages, and enables us to conceive in a single quantitative value a multitude of details. In a series of measurements of *one and the same* thing the average is likely to be the more reliable estimate, but it is no infallible rule for getting certainty out of uncertainty. No sort of average should be mistaken for an ideal type toward which the group or individual tends or even should tend. There is no necessary relation at all between average, ideal, normal, or satisfactory.

"Normal" then turns out to be a sort of elusive will-o'-the-wisp, used as a convenient expression to include the usual wide range of types found in a selected group whose occlusions are functionally and esthetically satisfactory. We cannot seriously attach any very precise mathematical meaning to normal, but include a range of forms. Each individual may have his own peculiar optimum form of occlusion best adapted to his individual needs as a whole (familiarly called his individual normal). The common sense of the orthodontist based on long experience should and will guide him in deciding what is functionally and esthetically satisfactory for the *individual* patient, practically attainable with the greatest simplicity and expediency and with the least probability of disastrous sequelae.

Perhaps the human animal exceeds all others in the number and variety of attributes he presents, and which are above the threshold of survival value. In anatomy, physiology, and biometry there is no clear-cut line separating normal from abnormal. The mere fact that variations exist does not at all imply, per se, that the variants should be or can be reduced to a single type.

Occlusion and its etiology are very complex, since occlusion represents the integrated effect of a great many components. Describing and measuring the anatomical minutiae of the jaws and their components in various forms of occlusion, and reducing them to averages should not be confused with etiology, which is the study of causes.

The problem of discovering what part heredity plays in etiology has engaged attention. The controversial literature would fill a volume, but much of it shows a regrettable paucity of critical analysis and resolves itself into balderdash. The problem of the relative importance of heredity and various aspects of environment in determining a given characteristic, as such, in a given patient has no meaning whatsoever. It is precisely analogous to the unanswerable question: Which is more important in the production of ice, water (the original material) or temperature and atmospheric pressure (the conditions)? However, the problem of relative importance of various in heredity and variations in environment in producing variation in occlusion, or deviation from type, has a definite meaning and can be solved.

Much stress has been laid on the importance of identical twins in the solution of these problems. These materials are interesting and have value; but, taken alone, they do not throw any light on deviation from type due to heredity or due to environment common to the family, a very large portion of the total environment affecting the general population. Identical twins are alike only because they are the result of certain common antecedent causes, and their correlation may be represented in the following way [going to the board]: Taken in conjunction with fraternal twins, and the knowledge that variation in occlusion (or any measurable component of occlusion) in the general population is the integrated effect of certain antecedent variables, one may derive sets of equations and solve for the proportionate part which heredity and various aspects of the environment play in the determination of occlusion. It turns out that heredity does play a more important part in occlusion than any or all other causes, and that family environment plays a most inconspicuous part. The answer is unequivocal. This stands out in contradistinction to the problem of incidence of caries, where the equations indicate that common family environment (diet and personal hygiene?) is by far the most important cause. All of this will be published in detail in the near future.

Fortunately the human population is replete with materials which can be used for the analysis of these problems of growth and development and their determination by antecedent conditions. Unfortunately orthodontia (and other fields of etiology also) has not availed itself of some of the best materials and accepted methods of analysis; hence, the present confusing and contradictory answers to these problems of causation, which answers frequently have all the earmarks of fine guesswork, dressed up to appear dignified. "Nothing is more certain than that a correct appreciation of the etiology of the irregularity of the teeth helps materially in diagnosis and treatment" (Wallace, 1932). Without such knowledge, treatment remains a vague, archaic, mechanical procedure commanding only commensurate esteem and consideration. It is hardly necessary to make gratuitous assumptions as to causes, which either only confuse or appear erudite to the uninitiated and only discredit a truly glorious and profound field of therapeutic endeavor.

President Kelsey.—This has been such an able discussion that I wish it were possible to prolong it. However, our program does not permit us to do that, so I will ask Dr. Lischer to close the discussion.

Dr. Lischer.—I am very grateful that my paper elicited so much discussion. Of course, I cannot speak otherwise than as a clinician and only as one who is sincerely interested in the scientific phases of our problems. My paper was written in response to an invitation which could not be declined, not because I felt I fully understood the problems with which it deals.

The recent work of Simon on the nature and diagnosis of dental anomalies and his contribution to the norm-concept has been questioned by one of you. I hasten to add that I not only admire the scientific merit of that work, but I also admire Simon for telling us frankly that the norm-concept is based upon a fiction.

The late Professor Vaihinger, who discussed the theory of fictions so thoroughly in his book, *The Philosophy of "As-If,"* said "the human mind sets itself problems which it cannot solve." Turn wherever we will, we find fictions in use. Even the government of the United States is based upon the fiction that all men are created free and equal. We all know that this is not a scientific fact but extremely useful. Personally, I would not care to live under any other form of government.

In a recent work by Professor Morris Cohen, *An Introduction to Logic and Scientific Methods*, I find he has a good deal to say about fictions and their uses.

I look upon Simon's *orbital law of the canines* in the same way in which Professor John Dewey defines *law* in his *Reconstruction in Philosophy*. He there defines *law* "as a constancy of relationships." Now, there is a constancy in the sagittal relationship of the denture of man to his face and head, a constancy which is sufficiently fixed for use in practice. Simon repeatedly says that there are no absolutely fixed, unchangeable points in the human head; hence his planes are not infallible. But they are a valuable diagnostic aid to the practitioner, like all diagnostic aids and methods in the entire field of medicine, none of which are unfailing.

Investigations conducted by the late Professor Orton and myself on Berkeley students (J. A. D. A., Sept., 1933, pp. 1553-1571) substantiated Simon's claims. This work was conducted with Simon's methods and instruments; and though the students presented a mixed racial group, including orientals, our sagittal norm curve differed only one-half of a millimeter from Simon's.

I want to thank Dr. Detlefsen for his discussion. I agree with him that averages are only a mode of procedure, but they are a very useful mode. In conclusion, may I remind you that the old dogma of occlusion is based upon the theory of the immutability of species, a theory which is obsolete in science today.

INLAY ATTACHMENT IN MOVEMENT OF IMPACTED CANINES

FRANK NICOLAI, D.D.S., BROOKLYN, N. Y.

I AM presenting two cases in which the inlay attachment was used in the movement of impacted canines following the procedure as outlined in the clinic given at the meeting of the American Society of Orthodontists in Nashville in 1930.

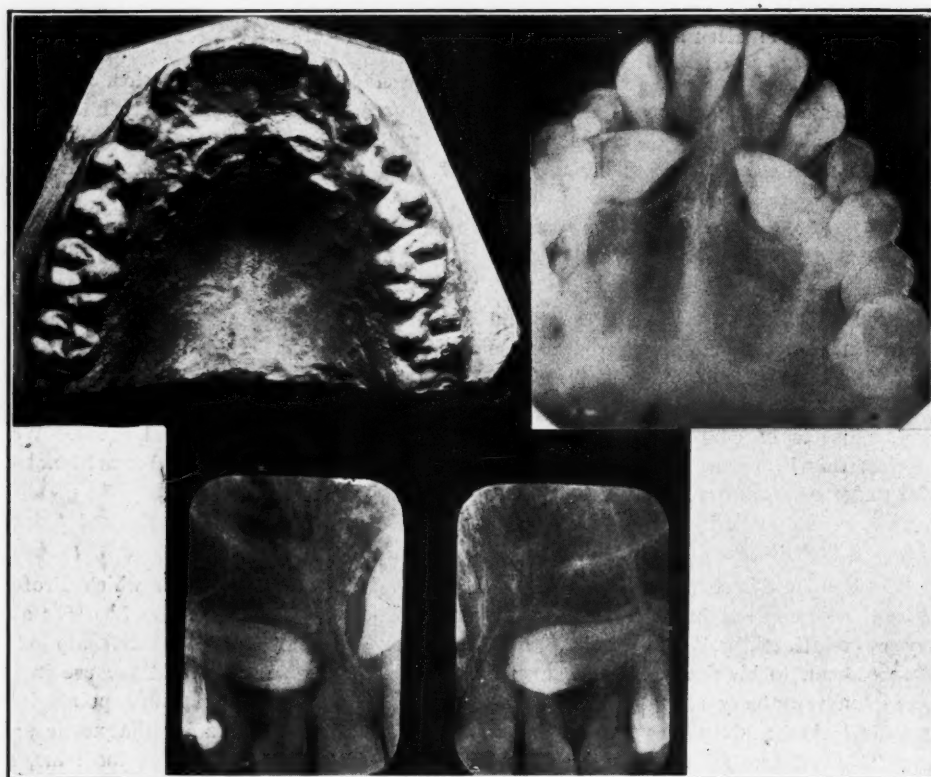


Fig. 1.

Of course, I do not use this attachment in all cases of impactions; I believe in the conservation of tooth material. However, if the tooth is at an unfavorable angle or deeply imbedded or if the amount of tissue destruction is too great for employing the usual methods, then I prepare and insert this attachment, which is to be used after the tooth has been surgically exposed. This inlay is an 0.040 wire made of 22K gold and about $\frac{1}{8}$ inch long, to which on one end is soldered a very small extension like a foot and on the other end an open loop.

The first case is that of a boy, aged thirteen years, with maxillary left and right impacted canines (Fig. 1). Treatment was commenced in July, 1929. A Mershon lingual appliance was constructed with stabilizers in front of both

Read before the New York Society of Orthodontists, New York, N. Y., April 10, 1934.

first premolars. Both canines were almost horizontally placed and deeply imbedded; therefore employing the usual methods would call for considerable tissue destruction.

Both canines were surgically exposed by an oral surgeon, so that the tip and about one-half of the tooth were visible; dressings were tightly packed, and the appliance was inserted, which carried extensions to hold the dressings in place. A week later the appliance and dressings were removed, and on the



Fig. 2.



Fig. 3.



Fig. 4.

lingual surface close to the distal side, cavities were prepared carefully to receive these inlays, which were then cemented into position. The lingual appliance was reinserted minus the extensions used to hold the dressings.

Silk ligatures were fastened from the open loop on the inlay to the arch wire at the point where the stabilizers were attached. Fig. 2 shows the change up to January, 1930. At this stage the projecting part of the inlay was cut off, ground down, and burnished, as in the case of any dental inlay.

A new lingual appliance was constructed and inserted passing around both erupting canines, and by means of 0.020 auxiliary springs further progress was accomplished; in July, 1930, the condition was as shown in Fig. 3. In

addition to this a maxillary high labial arch was inserted; bands were placed on lateral incisors; and with springs the lateral incisors were rotated.

The case was finished in July, 1931 (Fig. 4). On close examination I believe you will find a normal appearance of the bony structure.

The second case is that of a young man, aged thirty-one years. It is interesting to note that this is a mandibular impacted canine which is generally viewed with an unfavorable prognosis, and that its position is as far forward as the central incisor. As a matter of fact, the patient was referred to me because of the fact that while under consideration for its complete removal by a dentist,

Fig. 5.

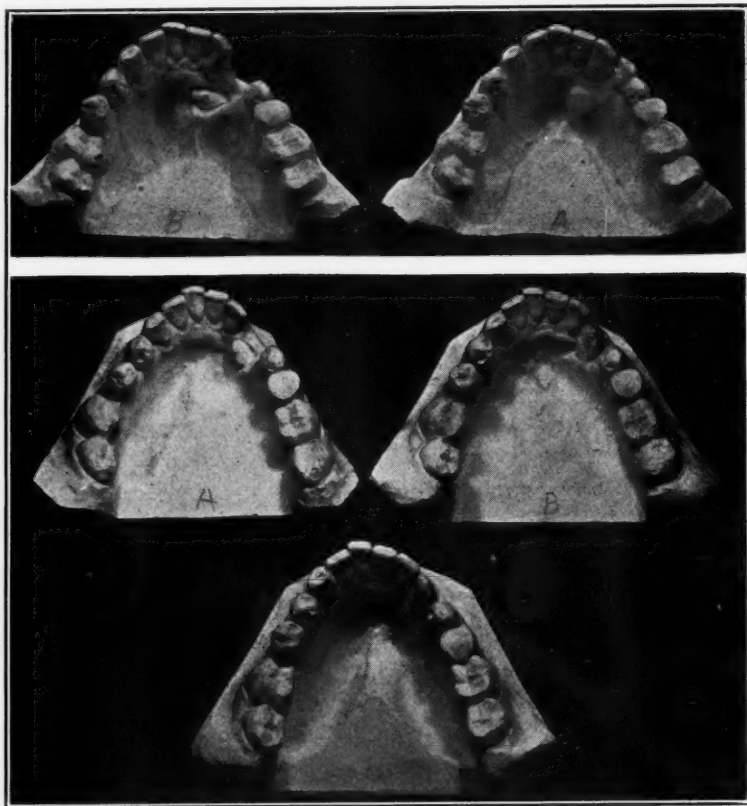


Fig. 6.

it was feared that the mandibular central and lateral incisors would also be lost. The original condition is shown in Fig. 5 A. In April, 1928, a Mershon lingual appliance was constructed with stabilizers in front of both premolars. The tooth was then exposed by an oral surgeon, dressing tightly packed and the lingual appliance reinserted with an extension to hold the dressing in place. A week later the appliance and dressings were removed. Because of the tooth, from tip down, being wedged tight against roots of both central and lateral incisors and because of its rotation, there was no choice but to use the inlay attachment on the labial surface. In Fig. 5 B is shown the progress made up to August, 1928. Silk ligatures were used and at times a rubber band as the tooth was very firmly imbedded in the mandible. Now as further movement was taking place the

lingual appliance was interfering with the loop on the inlay; so the lingual appliance was discarded and a mandibular labial appliance was used with a space retainer between the premolar and the lateral incisor.

In Fig. 6 *A* is shown the condition in April, 1929. At that time the attachment was ground down and burnished as in the first case. A band was then fitted, cemented, and ligated to the labial appliance. In November, 1929, all appliances were removed, and the progress is shown in Fig. 6 *B*. The case was

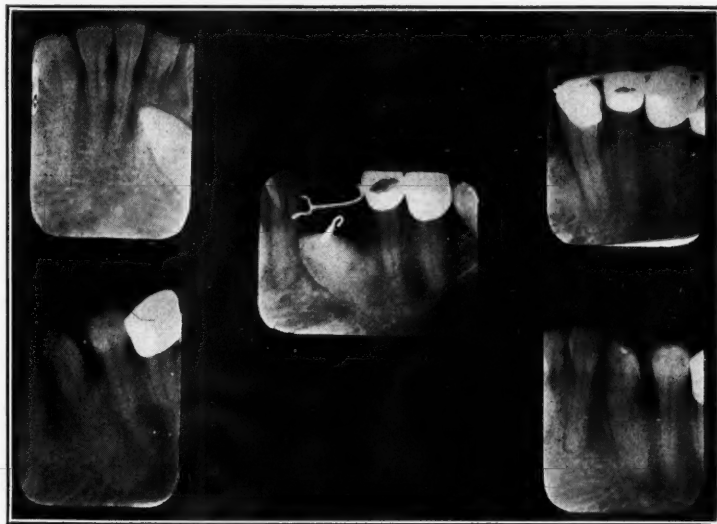


Fig. 7.

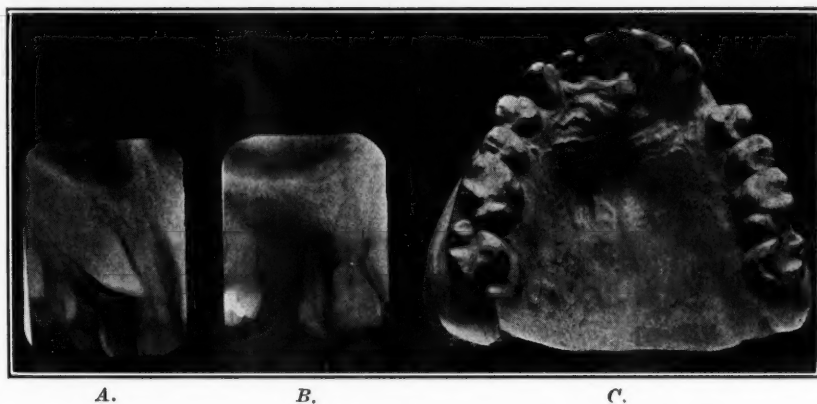


Fig. 8.

then placed under observation, and without any interference the tooth came into occlusion as may be seen in Fig. 6 *C*, which was July, 1931.

The different stages are shown in Fig. 7. The patient's dentist drilled out the gold inlay during the period of observation, and the cavity was filled with a porcelain filling, so the tooth appears unblemished besides being firm and sound, and is a very useful member for masticating purposes.

In Fig. 8 I am showing just by way of contrast as to what may happen when advice is not followed. A friend of mine in general practice of dentistry

told this patient, aged twenty-five years, to have the impacted canine treated orthodontically. Instead the tooth was removed, and six months later this condition presented itself for the dentist: there is a great loss of bony tissue and possibly also the loss of the lateral incisor, as it is fairly loose. In Fig. 8 *A* is shown the case before the operation, and Fig. 8 *B* shows the radiograph taken after operation. The angle of the impacted canine is favorable, and it would not have necessitated the use of the inlay attachments; one of the usual methods could have been employed. The model in Fig. 8 *C* shows what an excessive amount of removal of bone during the operation will do, that a normal contour of the palate can never be expected, and we only invite a possible bone infection.

A SIMPLE APPLIANCE FOR THE CORRECTION OF UNILATERAL MESIODISTAL MALRELATIONSHIP

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THIS case can hardly be called a case report, as stated in the program, for two reasons: first the records of the case are not complete, as there are no photographs of the patient; and second, not enough time has elapsed after the completion of the case. When Dr. Barber asked me if I had some case that would demonstrate tooth movement accomplished by an appliance of simple design, I thought this case might prove interesting in connection with that particular subject.

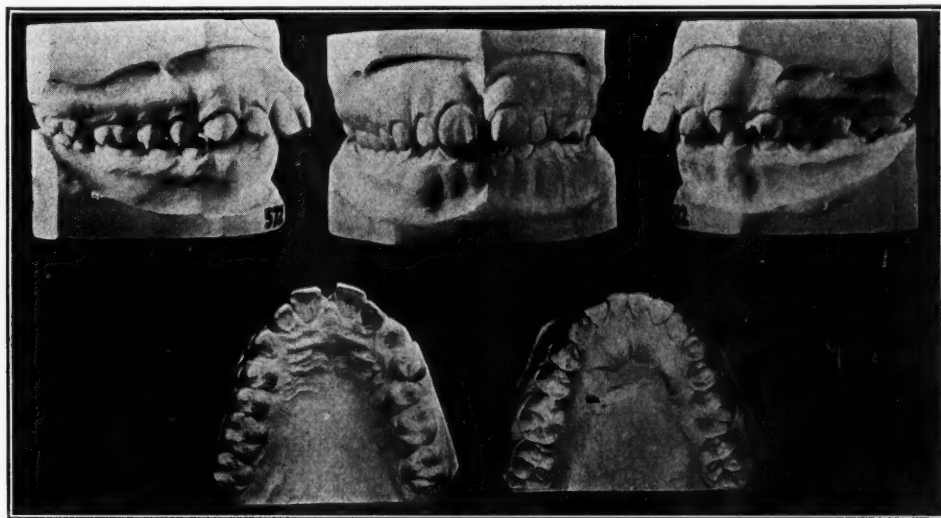


Fig. 1.

Fig. 1 shows views of the original models. As can be seen from the front view of the original models, there was a decided protrusion of the maxillary anterior teeth with a large diastema between the central incisors. The frenum seemed to be attached deeply, forming a crevice between these teeth, and the teeth were somewhat loose. However, the original radiographs showed no abnormality in this region which I could detect. As can be seen, the mandibular anterior teeth rested on the palatal gum tissue.

On the right side the mesiodistal relations were almost correct but the buccolingual relationship of the second molars was not quite right.

On the left side there is mesiodistal malrelationship. This, in my opinion, was due to a mesial position of the maxillary teeth rather than a distal relationship of the mandibular teeth. It is for this reason that I have entitled the re-

Presented at the meeting of the New York Society of Orthodontists, New York, N. Y., April 9 and 10, 1934.

port as I have. I could not call it unilateral distocclusion because I do not believe that to be the case. I arrived at this opinion through a study of the models in relation to the patient. I must confess that no other diagnostic schemes were employed, but I felt quite certain that a Stanton survey of the case would have shown the same thing. According to Simon's terminology I suppose it would be termed a unilateral maxillary protraction, but as the Simon plan of diagnosis was not employed, I thought it best not to use the terminology.

Fig. 2 shows to a better advantage the buccal relationship of the upper left first premolar and also its torsoversion. The horizontal and vertical overbite can also be seen more clearly.

In my opinion the movements necessary were as follows: a distal movement of the maxillary posterior teeth on the left side; a rotation and lingual movement of the maxillary left first premolar; a retraction of the maxillary anterior



Fig. 2.

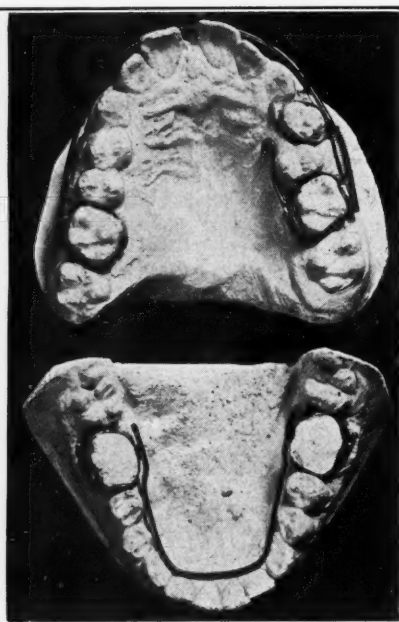


Fig. 3.

teeth which would automatically close the space between the central incisors; a very slight mesial movement of the entire mandibular arch, about the amount shown to be necessary by the original condition on the right side.

The appliance design was as follows: Fig. 3 shows the mandibular first molars banded and a plain lingual arch made with the idea of holding this arch approximately as it was. In the maxillary arch the first molars and the left first premolar were banded. There was an extension soldered to the lingual surface of the left first molar band. This extension ended in a hook opposite the mesial surface of the second premolar. There was a hook soldered to the lingual surface of the first premolar band. Small elastics were placed by the patient over these two hooks to rotate and at the same time to draw the premolar slightly lingually. On the buccal surfaces of the molar bands were horizontal round tubes. These were placed parallel to each other and also to the

median raphe. A buccal arch rested on the anterior teeth at approximately the gum line. On the right side of this arch was soldered a hook far enough removed from the buccal tube to allow the arch to slide into the tube on that side. On the left side a ring was soldered on the arch about 6 mm. from the mesial end of the buccal tube, and a coil spring was slipped over the buccal arch. This spring made the arch stand away somewhat from the anterior teeth when the intermaxillary elastics were not on. Hooks for intermaxillary elastics were placed on both sides of the buccal arch. Of course the object of the coil spring was to transmit the force of the intermaxillary elastic back to the first molar and thus produce a distal movement of that tooth. Naturally all the teeth on the left side would be subject to this pressure because of the elastic running from the lingual surface of the first premolar to the lingual extension

Fig. 4.

Fig. 5.

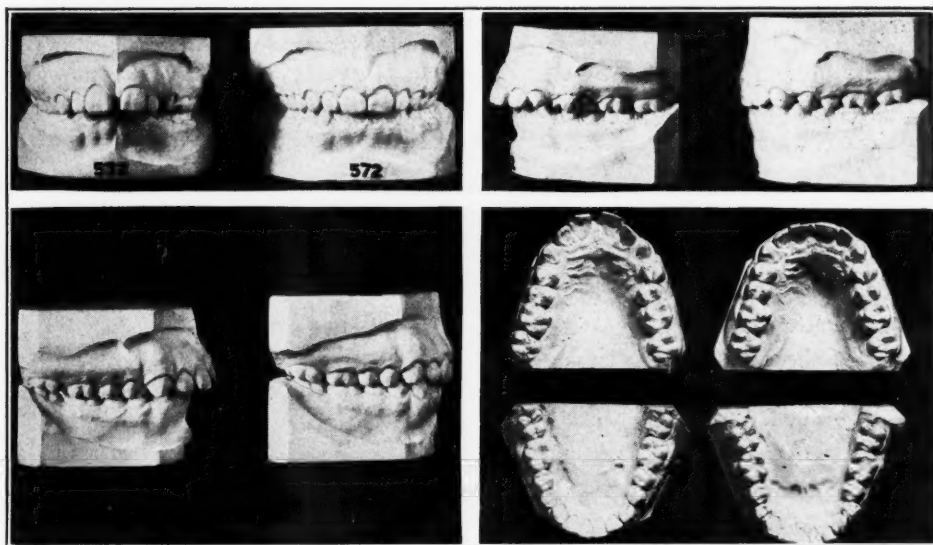


Fig. 6.

Fig. 7.

of the molar. With the intermaxillary elastic in place, the arch rested against the anterior teeth, and yet the force was applied to the posterior teeth on the left side.

For fifteen weeks very light intermaxillary elastics were worn. At the end of that time the intermaxillary elastic on the right side was discontinued and a small elastic substituted going over the distal surface of the buccal tube and the hook on the arch. On the left side the intermaxillary elastic was continued for six more weeks. Intermaxillary elastics were then worn on both sides for three weeks. At the end of that time the mesiodistal relations on both sides were correct. The coil spring was removed from the left side of the buccal arch and a hook soldered to act as a stop to prevent the buccal arch from sliding into the tube. Small maxillary elastics were then put over the distal ends of the buccal tubes and the hooks on the buccal arch. These elastics exerted no further pressure but merely held the arch firmly in place. During all this time the arch could be removed by the patient for cleaning. (The indi-

vidual time records mean nothing in particular but are merely copied from the card of the patient.) They do show that the incorrect mesiodistal relationship was corrected over a period of twenty-four weeks. The patient continued to wear the intermaxillary elastics at night only for seven months more, at which time the mandibular appliance was removed. Thus the mandibular appliance was removed in just about a year from the time it was placed. In the meantime the small elastics from the lingual surface of the maxillary left premolar were replaced by a wire ligature to hold the rotation gained. After the removal of the mandibular appliance, the maxillary buccal arch was left on as a retainer for about six months more, at which time it was replaced by a Hawley plate. The results of this appliance are shown in Figs. 4—7. I would again call your attention to the fact that after placing the appliance, my principal function was to inform the patient when and where the elastics should be worn. Practically no adjustment of the appliance itself was made.

Fig. 4 shows the comparison of the first and second sets of models. The date of the first model is May, 1932, and the second November, 1933. The maxillary anterior teeth have moved in, the space between the central incisors has closed, and the vertical overbite has also been corrected. With the closure of the space between the central incisors the teeth became much firmer in their attachment than they were originally. Note the disappearance of the cervice between the central incisors.

Fig. 5 shows the comparison of the right sides. Note the correction of the buccolingual relationship of the second molars accomplished by nature during the treatment.

Fig. 6 shows the correction of the mesiodistal malrelationship and the correction of the buccal position of the maxillary left first premolar.

Fig. 7 shows the occlusal views of the two sets of models. In spite of the mandibular lingual arch there has been a forward movement of the posterior teeth on the left side. This may account to some extent for the mesiodistal correction accomplished.

In conclusion I again repeat that this has not been presented because of any impressive result obtained, but more as an example of what a simple appliance, with practically no adjustment, can accomplish when the gods are with you.

SOME SUGGESTIONS FOR THE IMPROVEMENT OF ORTHODONTIC PRACTICE*

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EVERY professional policy should first be laid against the specification of the greatest good to the greatest number.

Every member of the dental profession has something of the character of a public servant, and he owes it to his profession and to the public to give his efforts for solution of the economic problem of how his profession can best serve the public, i.e., render the greatest good to the greatest number.

Because of the world-wide depression, it becomes a national obligation for all organized groups, including professional groups, to pause for a stock taking in order to evaluate what has been accomplished and how best to plan in the future so that professional activities will result in the greatest good to the greatest number.

We are confronted in dentistry by two major problems, caries and dystrophies of the jaws.

Caries has such a general distribution that the laity is surprised when it is spoken of as a disease. The ravages of caries are appalling; when a survey is made of large groups of children or young adults, we find that relatively few are caries free. If we could sum up the total economic loss to the nation, due to caries, we should have a staggering, unbelievable figure. Dr. J. O. McCall at the Guggenheim Clinic examined 4,600 children with a caries index of 97.5 per cent. There was an average of 9.5 cavities per child, while only 117 children (2.5 per cent) were free of caries. The group required, on the average, 2 extractions per child.

In the 2 year age group, 41 per cent were free of caries.

In the 3 year group, 17 per cent were free of caries.

In the 4 year group, 9 per cent were free of caries.

Dr. Alfred Walker examined the mouths of 178 boys between the ages of twelve and seventeen years.

First Molars

Missing	121 of the 712
Carious	310 of the 591
Requiring extraction	70 of the 591

Second Molars

Missing	7 of the 712
Carious	301 of the 705
Requiring extraction	9 of the 705

*Paper read before Eastern Association of Graduates of the Angle School of Orthodontia.

Other Teeth Than Molars

Missing	46
Carious	329
Requiring extraction	57

Summary of 178 Boys

Missing teeth	174
Carious	940
Requiring extraction	136

Walker also examined 580 children at the Locust Valley School. Four hundred and fifty-one or 77.7 per cent had either dead pulps, abscessed teeth, or caries to the pulps. Two hundred and fifty-eight or 44.48 per cent had superficial caries.

Seventy per cent of the population of the city of New York between the ages of twelve and seventeen is 483,000. If these mouths are in a similar condition to the mouths of the 178 boys of the Boys' Club, it would require the services of many dentists to do the required restorative work. A conservative estimate of the chair hours required to repair these mouths indicates that 75 per cent of the required work could have been prevented by proper preschool dentistry.

The distribution of malocclusion we do not know. Various observers vary widely in their estimates. Some are as high as 90 per cent and some as low as 5 per cent. From the best available data, a reasonable figure would appear to be between 35 and 50 per cent.

The etiology of caries and dystrophies of the jaws is unknown; hence, as Brashwell states, orthodontic therapy is an empiric experiment.

It is the purpose of this paper to suggest a plan which not only will change the present methods of conducting orthodontic practices, but will also contain suggestions for the improvement of undergraduate teaching in dental schools.

The plan which I shall attempt to justify is as follows: The orthodontist of the future will try to have all children referred to him at age two years, at which time record casts of the mouth are to be made, and periodically thereafter until such time as the orthodontist deems most opportune for the use of appliances.

All precarious pits and fissures are to be filled and prophylactic treatments are to be done by the orthodontist or by some one under his direction in his own office.

Undergraduates are to be taught:

1. The proper care of the mouth, starting with the child at two years of age. Stressing the importance of early detection of pits and fissures and best methods of filling, together with periodic prophylactic treatments and examinations for caries.

2. A proper technic for taking orthodontic impressions from which record casts are to be made.

3. Technic for constructing proper space retainers and their use.

As previously stated, we do not know the etiology of caries and dystrophies of the jaws and are, therefore, in a weak position to apply therapeutic measures.

It is incumbent that we select the best methods of treatment in our practices, i.e., the type of treatment which will prevent the greatest amount of trouble and give the greatest benefits to the largest number at the least cost. This can be realized, in my opinion, by the adoption of the proposed plan of having the orthodontist control all children from age two years, i.e., the orthodontist to perform all dental services until the case is dismissed. Each patient is to be carried until the eruption of the third permanent molars or until such time as the periodic radiographic examinations show the probability of normal eruption.

In the event an orthodontist did not wish to do the prophylaxis and make fillings, a dentist trained in children's dentistry should be associated in the same office.

Quoting from the paper by Willett¹: "There is much in the practice of children's dentistry that precedes, intermingles with, and affects orthodontic procedure, that distinct lines of demarcation in the practices of the two cannot be definitely established."

The acceptance of the child at two years allows the orthodontist to make record casts at this early age, to be followed by periodic study casts, thus permitting the orthodontist to observe the orderly growth changes of the normal cases, and permits the selection of the most opportune time for orthodontic therapy in those cases requiring treatment.

The importance of keeping the child under a period of observation controlled by periodic casts cannot be overestimated.

Willett's survey¹ of 1,000 cases of children ranging in age from seventeen months to ten years to determine the effect of caries of deciduous teeth, defective fillings, premature loss of deciduous teeth, evident neglect of preschool dental attention in complicating the problem of malocclusion:

Caries of deciduous teeth and defective fillings	60.3%
Premature loss of deciduous teeth (893)	28.9%
Caries, defective fillings, and premature loss of deciduous teeth, the direct cause of malocclusion	8.4%
Caries, defective fillings and premature loss of deciduous teeth, a contributing cause of malocclusion	52.5%
Evident need of preschool dental attention	61.2%

This list clearly indicates the need of starting each child not later than the second year of life if we are to avail ourselves of the known preventive measures.

It also shows the fallacy of the school clinic as now organized; when the child reaches the school age and enters the clinic, much preventable damage may have already occurred, which clearly points to the need of the *preschool dental clinic*.

The general acceptance by orthodontists of the above plan would result in a large accumulation of data which if properly evaluated would throw considerable light upon the problem of what is the best time to start orthodontic therapy.

Hellmann, Johnson and others have suggested that we have not given enough thought to the problems of growth before inserting appliances and that the re-

sults of treatment may have been due to growth rather than to the orthodontic appliance. In some cases, the orthodontic appliance may have actually interfered with the growth processes.

Brash² states: "There is evidence that the genesis of the average deformed palate is to be found in the very early years of life. . . . My own studies of the growth of the alveolar processes of the jaws, convincing me of the constant changes taking place in that remarkable bone and leading to the general con-

Fig. 1.

Fig. 2.

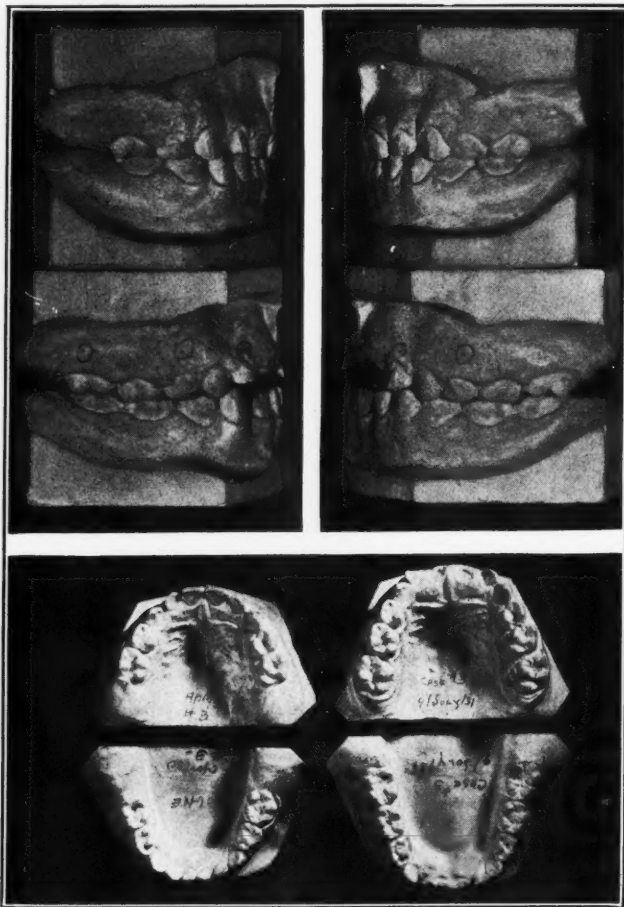


Fig. 3.

Fig. 1.—Right lateral view of Case 3. Top model, four years and ten months; bottom model, six years and one month.

Fig. 2.—Left lateral view of Case 3. Top model, four years and ten months; bottom model, six years and one month.

Fig. 3.—Occlusal view of Case 3. Left model, four years and ten months; bottom model, six years and one month.

clusion that at least throughout the growth period, the teeth 'erupted' and 'erupting' alike are constantly moving in the bone . . . these studies must have their bearing on etiology, if they in any way throw light on the mechanism of growth and the possible mechanism of the production of what we consider to be malocclusion."

Undoubtedly Brash is correct in stating that the dentition is in a constant state of flux and that important information may be obtained by a study of the relative movements of the teeth during the growth period.

I have under observation 230 children for a period of fifteen years, in the Division of Child Research, New York University College of Dentistry. Yearly casts of the occlusion are made. These casts are orthographically projected, enlarged 5 diameters, and the yearly maps are related by the formula of least squares to show the relative changes of the teeth due to growth processes.

Figs. 1, 2 and 3 illustrate normal occlusion at age four years and ten months, and six years and one month. The map in Fig. 4 shows the mandibular arches related to show the change in arch form and the relative movements of the teeth which are represented by dots (tooth centroids).

Fig. 5 shows maxillary maps. From a comparison of the maxillary and mandibular maps it would appear that the growth changes of the mandible were

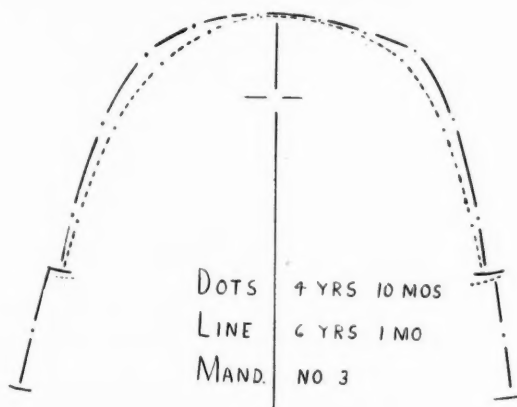


Fig. 4.

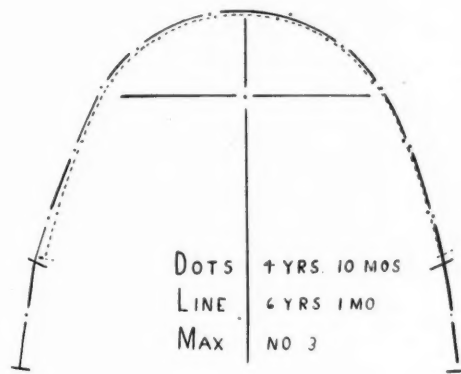


Fig. 5.

Fig. 4.—Mandibular map of Case 3. Dotted line, four years and ten months; solid line, six years and one month.

Fig. 5.—Maxillary map of Case 3. Dotted line, four years and ten months; solid line, six years and one month.

much greater than those of the maxilla because of the great divergence of mandibular arch form in the canine region as compared with the maxillary change.

A comparison of the linear growth measured between centroids of canines, first deciduous molars, and second deciduous molars on the two arches as revealed in Table I shows that there is little difference in the linear growth between corresponding tooth centers on the two arches, and the optical illusion is produced in the two graphs from the fact that all the side teeth (mandibular) are shown

TABLE I

	CANINE TO CANINE	DECIDUOUS M ¹ TO M ¹	DECIDUOUS M ² TO M ²
Max. growth 4 yr. 10 mo. to 6 yr. 1 mo.	1.8 mm.	1.3 mm.	1.2 mm.
Mand. growth 4 yr. 10 mo. to 6 yr. 1 mo.	2.5 mm.	1.6 mm.	0.8 mm.
Growth 10 following months maxilla	0.8 mm.	0.4 mm.	0.3 mm.
Growth 10 following months mandible	0.1 mm.	-0.3 mm.	0.1 mm.

in a relatively forward position while the opposite movements are recorded in the maxillary graph. If the formula for map placement is correct, we are able to account for a phenomenon that has puzzled previous investigators and led them to wrong conclusions; i.e., other investigators have noted the changing occlusal relations of the side teeth due to growth changes. The mandibular teeth appear to assume a more mesial relation to the maxillary teeth (as shown in the two models in Fig. 1). This has been interpreted as a more rapid growth forward of the mandibular arch as a whole, while in reality it is due to the effects of lateral growth of the two arches whose structural elements, the teeth, are dis-

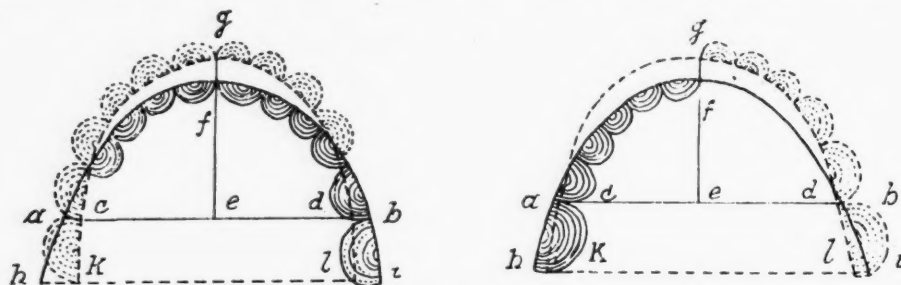


Fig. 6.—Franke's placement of the deciduous and permanent dentitions.²

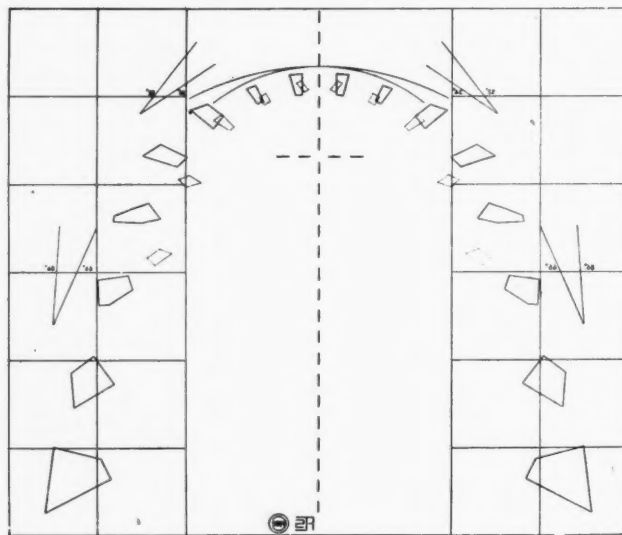


Fig. 7.—Author's placement of the two dentitions. Solid boxes drawn around the area of variability of the tooth (mandibular) centroids in a series of normal permanent dentitions. Dotted boxes drawn around the area of variability of tooth centroids of a series of normal deciduous dentitions. Angles shown in first molar region indicate range of variation in the angulation of first molar. Angles shown in canine region indicate range of variation in the angulation of the permanent canines. The two arcs in front indicate the range of variation in the anterior curvatures of the permanent dentitions.

tributed in arches of varying radii of curvature; hence, when these two arches of teeth are changed by equal lateral growth, it follows that the interrelations of the side teeth of the two arches, although they preserve correct buccolingual relations, must suffer deformations in their mesiodistal relationships due to geometric laws.

In Franke's³ exhaustive study of growth changes of the jaws, he assumed that the permanent incisors occupied a position relatively distal to the position

of the deciduous incisors. (Fig. 6.) This error arose because Franke had no correct formula for relating his graphs of the deciduous and permanent dentitions. Franke drew a line at the distal surface of the deciduous dentition and related it to a line drawn across the mesial surfaces of the first molars of the permanent

Fig. 8.

Fig. 9.

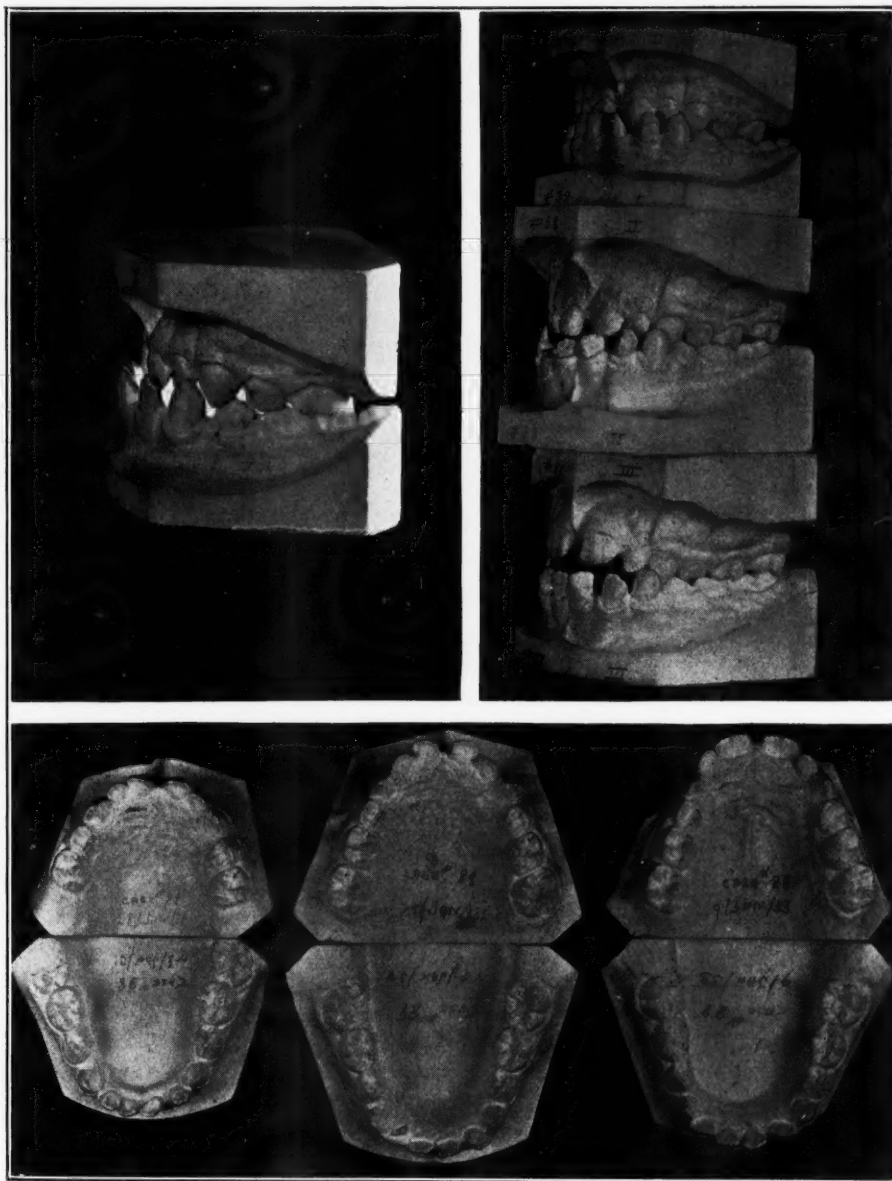


Fig. 10.

Fig. 8.—Left lateral view Case 88, six years and five months.

Fig. 9.—Left lateral view Case 88. Top model, six years and five months; center model, seven years and five months; bottom model, eight years and five months.

Fig. 10.—Occlusal view Case 88. Left model, six years and five months; center model, seven years and five months; right model, eight years and five months.

dentition. He, therefore, fell into the error of showing the permanent incisors distal to the positions occupied by the deciduous incisors as the linear distance from the line drawn across the mesial surfaces of the first molars to the front

of the arch is shorter than a similar line drawn from the line across the distal surfaces of the deciduous second molars to the front of the arch.

Fig. 7 shows a composite graph of a series of normal deciduous dentitions related to a series of normal permanent dentitions. The irregular boxes enclose the areas of variability of the individual tooth centroids of the permanent and deciduous teeth (mandibular). The two graphs are related in such a way as to allow the deciduous canines to move radially out and forward, thus copying the changes shown in our study of the normal growth changes of individuals as shown in maps, i.e., a progressive flattening of the arc of curvature from canine

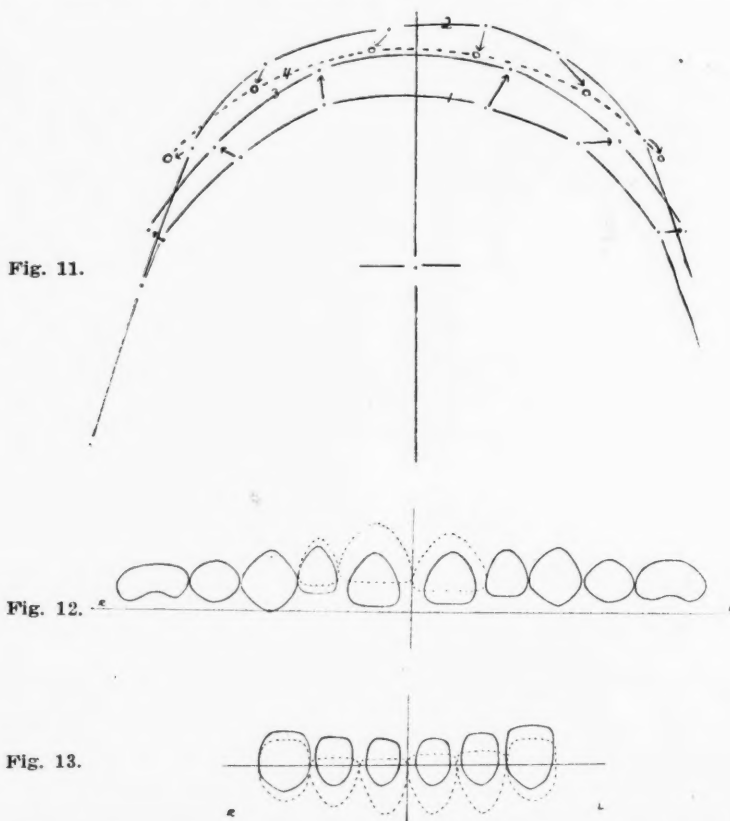


Fig. 11.—Maxillary and mandibular maps. Arc 1, maxillary, six years and five months; arc 2, mandibular, six years and five months; arc 3, maxillary eight years and five months; arc 4, mandibular, eight years and five months. Arrows indicate the relative movements of the tooth centroids.

Fig. 12.—Vertical map to show relative change of the incisors (maxillary). Solid line, six years and five months; dotted line, eight years and five months.

Fig. 13.—Vertical map to show relative change of the mandibular incisors. Solid line, six years and five months; dotted line, eight years and five months.

to canine resulting from increase of linear distance between the canines, hence shortening of the arch and a consequent mesial drift of the deciduous mandibular molars.

This constant change of form, in the alveolar processes with its resultant change on the mesiodistal relations of the teeth, results in some curious three dimensional movements in cases exhibiting malocclusion at one age with improvement, without orthodontic interference, at a later age. Figs. 8, 9, and 10 show

three stages of growth in a child at ages six years and five months, seven years and five months, and eight years and five months with three dimensional improvements of occlusal relations in the incisal region.

The horizontal graph in Fig. 11 shows movements of incisors between the ages of six years and five months, and eight years and five months. The maxillary incisors have moved forward and the mandibular incisors have moved backward.

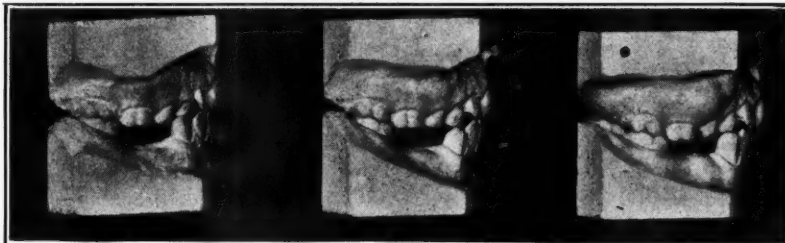


Fig. 14.



Fig. 15.

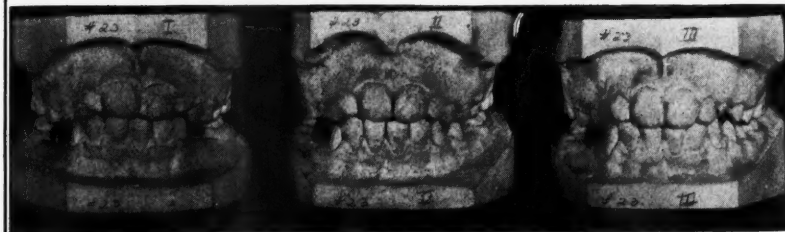


Fig. 16.

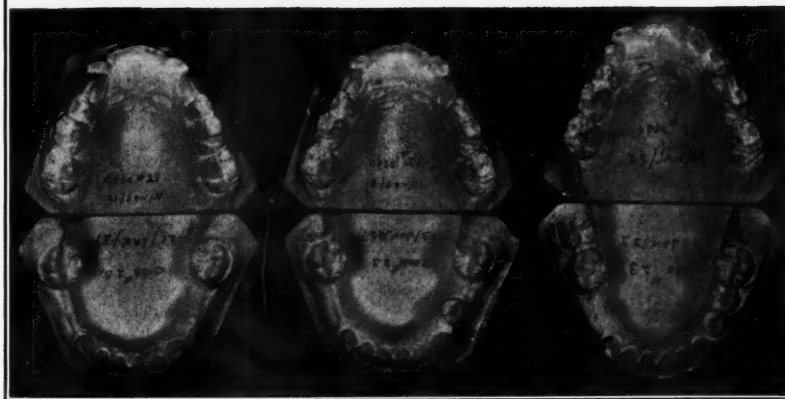


Fig. 17.

Fig. 14.—Right lateral view of Case 23. Left model, eight years and three months; center model, nine years and three months; right model, ten years and three months.

Fig. 15.—Left lateral view of Case 23. Left model, eight years and three months; center model, nine years and three months; right model, ten years and three months.

Fig. 16.—Front view of Case 23. Left model, eight years and three months; center model, nine years and three months; right model, ten years and three months.

Fig. 17.—Occlusal view of Case 23. Left model, eight years and three months; center model, nine years and three months; right model, ten years and three months.

Fig. 12 shows the relative movements of the maxillary teeth in the third dimension: solid line six years and five months; dotted line eight years and five months.

Fig. 13 shows the relative movements of the mandibular teeth in the third dimension: solid line six years and five months; dotted line eight years and five months.

Figs. 14, 15, 16, and 17 show models of three stages of growth in a case. Examination by eye reveals the improved occlusal relations of the right canine region, and the shifting of the midlines between the maxillary and the mandibular incisors.

In the first model there is considerable malrelation between these two lines, while in the last model the two midlines have shifted into almost normal relations.

It would be difficult to estimate the relative movements which have occurred without a formula for relating the successive graphs. Fig. 18 shows the maxillary movements that have occurred. Solid line, age eight years and three months, dotted line, age nine years and three months. The incisors have moved to the

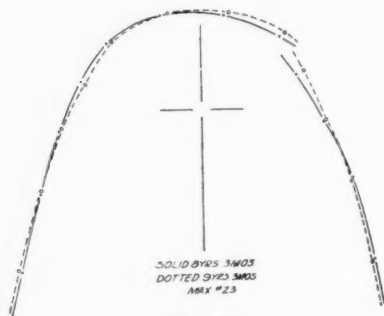


Fig. 18.

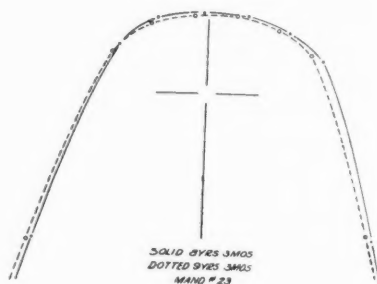


Fig. 19.

Fig. 18.—Maxillary map of Case 23. Solid line eight years and three months, related to maxillary map dotted line, nine years and three months, to show relative change in arch form and the relative movements of the teeth.

Fig. 19.—Mandibular map Case 23. Same explanation as for Fig. 18.

right. Little change has taken place in the left lateral half of arch with considerable improvement in the right lateral half. Fig. 19 shows mandibular arches. The incisors have all moved to the left (a reverse of the maxillary movements). The right lateral half of the arch has moved toward the sagittal plane. These reverse movements of the two arches are tending to bring the right lateral arch form in harmony with the left.

From this evidence combined with similar evidence of other workers, in various parts of the world, it would seem wise to hesitate before starting treatment on deciduous and mixed dentitions until the case had been preceded by a series of study models, starting at age two years; this procedure might throw light on which cases improve without treatment and the types which will not improve. By delaying treatment even in those types which we know will not improve, we may determine the most propitious time for starting treatments.

The importance of this whole subject should arouse the dental schools to a more thorough teaching course for undergraduates, i.e., a course designed to show

that the end-results of neglected caries may be impaired general health and aggravated cases of malocclusion. The course should also include a proper technic for plaster impressions and good models in order that the student on entering practice will seek children for patients for whom he not only will fill all precarious pits and fissures but will also make periodic record casts. Thus he will be self-educating, as the record casts will reveal to him the normal growth changes in some cases and the unfolding of deformities in others, to the end that he will seek the help of the best type of orthodontist, or become himself a postgraduate orthodontic student.

CONCLUSIONS

1. Much preventable damage may be present when the child enters school; hence the preschool clinic should be stressed.
2. Because of the present apathy of the dental profession (not desiring children as patients) the orthodontist should seek all children at age two years and take full charge of the mouth.
3. It is uneconomic to develop a specialty such as pedodontia with its inability to care for the orthodontic needs of the child. The pedodontist should either educate himself in orthodontics or associate himself with an orthodontist.
4. The orthodontist should perform all dental services for the child starting at age two years or be associated with a pedodontist.
5. Dental schools should have adequate courses for the undergraduate, stressing the preventive measures applicable to the child of two.

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THE PROBLEMS OF THE DUAL BITE WITH PARTICULAR REFERENCE TO THE TEMPOROMANDIBULAR ARTICULATION

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RECENTLY I received a letter from a prominent orthodontist, a man who does his share of scientific thinking, in which there appeared a question which I thought at the time to be an appropriate subject for discussion before a society of experienced orthodontists.

The question which was asked was whether or not a case of posterooclusion or distoclusion could be considered complete if a patient continued to exhibit a dual bite. Dual bite may be considered by many as merely a phase in the treatment of distoclusion. That is essentially true, but it does not always occur during the treatment in this class of malocclusion. In fact, we sometimes find this condition in untreated cases in which the patient with well-formed arches, and apparently well-formed occlusal curves, makes use of two positions according to the type of functional activity he is at the moment utilizing.

The question at once called to mind patients in my own practice in whom this condition has existed, many of whom have been satisfactorily corrected of this troublesome tendency to revert to a distal position when the function of mastication was undertaken.

So much from authoritative sources has been presented in recent years that I shall not lengthen this paper by a review of the anatomy and physiology of the temporomandibular region. Perhaps it is because of increased knowledge that this region is receiving more attention, and that some of the problems in which it is involved are beginning to show some likelihood of solution.

First of all, let me ask, when the problem of dual bite is brought before your minds what mental picture takes form? Since it is essential that we all, if possible, have a similar picture in mind, perhaps if I describe a case and later illustrate it you will gain a conception of the picture that I have.

The child in question has well-developed maxillary and mandibular arches. The occlusal curve seems to be normal. The mandibular buccal teeth present the normal lingual inclination, and when the arches are held in a position of neutroclusion there can be discovered no marked cusp interferences, it being physically possible for this patient to present, for exhibition purposes, what appears to be a thoroughly typical occlusion. Yet, when the patient is engaged in conversation the mandible reverts to a distal position—the same being true during the act of mastication. A careful examination reveals that the habitual masticatory position does not seem to provide nearly so adequate or advantageous an instrument for masticating food as the neutroclusion that the child is able to assume by conscious control. It is of importance to note that one of

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the important features in dual bite is that such cases are frequently dismissed as corrected in perfectly good faith by many orthodontists. It has been my observation with children of this class that their musculature seems to be in an atonic condition—that they are prone to the habit of resting the mandible upon the open palm of the hand, which is supported by the elbow on the table, desk or the arm of a chair. If it were possible to follow these children through their daily regime, in all probability we should find that many hours each day were spent in this position, in which complete relaxation of the mandibular muscles had taken place.

An important and fundamental thought in relation to this type of case is the fact that these patients may upon volition assume and maintain for long periods of time the correct position. We may consider, as a first principle, that voluntary position may under the proper guidance become habitual, and furthermore that it cannot and will not become habitual until certain important physical changes have taken place. When these physical changes have occurred, it then becomes impossible for the patient, even voluntarily, to place the mandible in the posterior position, and not until this has occurred can we assume that the treatment is complete. When considering any of the moving parts of the body we must keep clearly in mind that a dual conception is necessary—the biologic and the mechanical. It is right for us to think of the human body as a machine whose development is inherent, modifying its form according to actions peculiar to itself. That is one of the reasons why we have slight variations in form that are not of genetic origin.

We are not alike in many particulars because we do not act alike. It is because of this that our work must be so individual, and that we must accept the fact that no two individuals react in a parallel manner to stimuli from like sources. Yet we know that the mechanical principles are always the same, although the parts may perform their function in a variety of ways. In the study of dual occlusion we are to remember that all mandibular movement is the result of muscular action, and that while the underlying mechanical principles do not vary there are physiologic changes always occurring as a result of the habitual direction of movement and the degree of stress. For the most part the direction of these mandibular movements is determined by the occlusal surfaces of the teeth, but all movements of the mandible are not influenced by the position of the dental organs. The habitual positions, then, of the mandible have other factors of influence. The continued relaxation of the muscles or their atonicity may be as great a factor when considering the dual occlusion as any other that might be contemplated.

When we think of the minute and distributed changes which must take place, it is difficult to be sure where they actually occur. There is during the active treatment a temporary redistribution of force resulting from the new and assumed relationship between the parts—the stress being felt first by the muscular and ligamentous tissues; but these temporary changes in direction and stress ultimately find their response in the changed form of the osseous tissue; and when these osseous changes have taken place, the muscular tissues are again without unnatural strain. We know that the mandibular joint permits an extraordinary variety of motions. In fact, hardly any other joint in

the human body will be found to permit so many variations, or so many different kinds of motion. Yet, with even so adaptable a joint or articulation it is not proper to assume that all the changes take place in this location. We know that the mandible and certain of its parts are subject to reconstruction under the influence of function.

The changes that take place in the mandible from infancy to adult life are tremendous, and we, therefore, have the right to the assumption that under the influence of properly directed functional activity readaptation of various areas must eventually follow.

Radiographs of the mandibular articulation have until recently been quite unsatisfactory, but we are beginning now to obtain more or less satisfactory pictures showing the relative position of the head of the condyle to the glenoid fossa during the anterior and posterior movements of the mandible. During the past few years I have endeavored to secure radiographs of this area in a number of cases of dual bite. The first of the series of pictures shows the position of the head of the condyle with the mandible in a distal position, or as it is held during the act of speaking or masticating. Following this we obtain a picture showing the position of the head of the condyle during the voluntary placement of the mandibular arch in a position of neutroclusion. A third radiograph is taken when it is found that the patient has lost the ability to retract the mandible when speaking or during the act of masticating food. The illustrations in this article show a change which I have found to be typical in the treatment of such cases.

Prior to the time when radiographs of this area were satisfactory enough for the purpose of study and observation, I completed the treatment of several persistent cases of dual bite. At that time we relied upon the digital examination of the joint to determine its movement. This examination revealed the fact that when the patients assumed the position of neutroclusion the head of the condyle could be felt as it slid along the distal incline of the eminentia articularis. After a fairly prolonged treatment in which the Hawley retainer with inclined plane was used in conjunction with the masseter temporal exercise, the ability to bite in a distal position was gradually lost. These treatments occurred ten or twelve years ago. Recently I sent for the patients and obtained radiographs of the condyle path and position of the head of the condyle.

Still functioning in a position of neutroclusion it was interesting to note that the digital examination gave no evidence that the head of the condyle had remained in its former position well down on the eminentia articularis. The joint felt quite normal in its action, and the radiographs confirmed the fact that changes had taken place in the structure of the mandible with the result that the corrections are permanent.

It is unlikely that any permanent changes take place in the muscular or ligamentous attachments in this locality. The osseous tissue being fluid we can expect to produce changes in those parts where the greatest stress becomes centered—the neck of the condyle probably being the point of greatest change, because it is seen that under the stress of functional activity the head of the condyle has gradually progressed toward its normal position in relation to the glenoid fossa.

In attempting to overcome the dual bite it would seem that one of the first obligations of the orthodontist would be found in determining whether or not there are any slight cusp interferences which would have a tendency to retard the progress of development. The presence of discomfort or inconvenience in the patient's field of consciousness always hampers or defeats any effort made toward correction.

There are some who continue the use of intermaxillary elastics over a long period of time in their efforts to correct these cases, but I have experimented both with the use of the elastics and with the increased function of the muscles of mastication. With the latter alone or in combination with intermaxillary elastics the final satisfactory result seems to be obtained more quickly—simply because the change in form which is required to make the neutroclusion permanent occurs in less time when under an increased functional stress.

My observations so far have not revealed any special form either in the condyle or in its path common to these cases of dual bite. Before the radio-

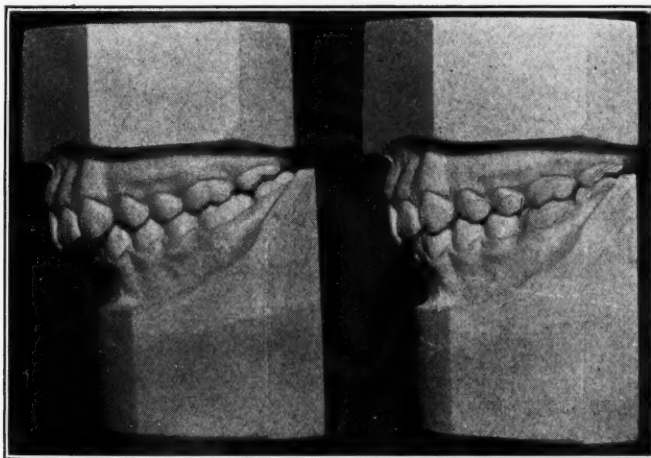


Fig. 1.

graphic investigation was begun, I considered the hypothesis that the size and form of the eminentia articularis might be found to conform, in a general way, in this type of case. But I have found upon investigation that it makes little difference as to the form and size of the eminentia articularis, the length of the condyloid path, or the form of the condyle itself. In fact, it appears that dual bite may occur in any one of the various types represented by the temporomandibular articulation. Nor have I been successful in discovering definitely the extent and location of the changes which must have occurred, although the neck of the condyle seems the most logical. My investigations have had to be continued without an adequate apparatus, and without the high technical skill in radiography essential for the accurate measurements of radiographs. Had I been able to make use of the technic used by investigators like Broadbent, I am certain a more definite and complete report could be made at this time. This confession of limitation emphasizes the fact that if we in orthodontic practice are to report our cases of development and growth as a result of treatment, in a purely scientific manner, it will become necessary for us to develop a technic

of precision within our means—a technic which makes each series of radiographs correspond exactly one with the other in respect to certain unchangeable locations found in the osseous tissue so that when the radiographic plates are superimposed they will correspond exactly in at least two constant points. When this is accomplished, it will then be possible for us to trace, as a regular routine, changes in form which occur during the process of treatment. With a simplified apparatus in the offices of many orthodontists the collection of evi-

Fig. 2.

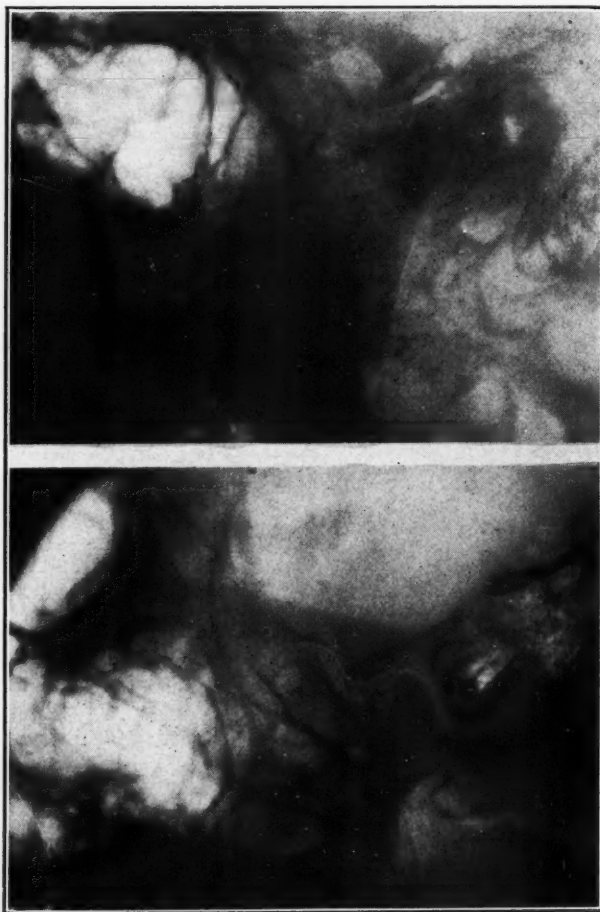


Fig. 3.

dences of growth and development will not be confined to the laboratories of our institutions, or to the few who are specially proficient in radiography.

Because of this lack of accuracy in the radiographic evidence I consider my presentation as merely preliminary, but at the same time it is my belief that the evidence so far obtained is of sufficient importance to encourage us to continue our efforts with the expectation of greater accuracy as we proceed. My belief, however, is that the work that I present to you, inadequate as it may be, shows quite conclusively that in cases of distoclusion, especially those cases treated by the employment of functional activity, there is evidence of a grad-

ual change represented by the changed position of the head of the condyle as it moves posteriorly into its former position when at the same time the patient is able to function with the arches in their correct mesiodistal relation; and



when this change has taken place, the patient possesses the inability to exhibit a dual bite, and also when this change has taken place, the danger of relapse seems to have disappeared.

Fig. 1 represents a typical case of dual bite.

I have already referred to cases treated many years ago—years before we were able to secure adequate radiographs of the temporomandibular region. These cases are the ones in which we made digital examinations which demonstrated that when the patients closed the jaws in neutroclusion the condyle could be felt as it slid well down on the distal surface of the eminentia articularis. Figs. 2 and 3 show the radiographs of the temporomandibular articulation which were taken ten or twelve years after the correction was completed, and which show that the head of the condyle is occupying a correct position in its relation to the glenoid fossa, while the patients are still functioning with their arches in the correct mesiodistal relation.

Fig. 4 shows three radiographs of a patient recently treated. *A* shows the position of the condyle with the patient biting in the distal position. *B* shows the patient biting in the neutral position. *C* was taken after the patient had received a year's treatment in functional activity with the use of the Hawley retainer and bite plane and the masseter temporal exercise. It will be noted that the head of the condyle has again assumed the position which it formerly occupied when the patient was biting in the distal position, but she is now performing all of her functions with the arches in the correct mesiodistal relation with the inability to function in the posterior position.

Fig. 5 illustrates the temporomandibular articulation of a child in the process of recovery. *A* shows the distal position assumed by this patient before treatment. *B* shows the position of the parts when biting in neutroclusion before treatment. *C* shows the position of the condyle as the patient now assumes the position of neutroclusion. This series illustrates the progressive drift of the condyle toward its correct position, which correct position probably will not be reached until after another six months or more of treatment.

DISCUSSION

Dr. Strang.—This is the first opportunity I have had to hear Dr. Rogers discuss the details of his method of treatment of distal location of the mandibular denture. My sympathy goes out to him when he apologizes for not having had the radiographic technic for visualizing the changes that have taken place because I have found myself in a similar position on various occasions. But clinical evidence still has its place in orthodontia and, I believe, always will be of importance. A great deal in medicine and dentistry has been discovered through clinical studies. It is a necessary part of our procedures.

There can be no just argument against any treatment that restores conditions to normal as its ultimate result, and it is that statement of Dr. Rogers which has put me more in sympathy with his work than I have ever been. We owe a great deal to our essayist for calling attention to the importance of the functional forces that play upon the denture and the advisability of using these functional forces in treatment.

If all had the persistence, the personality, and the ability to obtain as great cooperation from their patients as Dr. Rogers, I am sure similar results could be produced.

In the most generally accepted method of treatment of Class II cases, a deformity is primarily created by moving the maxillary denture distally, in order to obtain normal functional forces with the object of reestablishing growth in the mandible through their action. Coincidentally with this renewed growth, the mandibular denture is eventually carried forward to its correct relationship with the cranial anatomy. Dr. Rogers is working along the same line, as I see it. He also creates an abnormality of another type, and maintains it until function has reestablished normal relationship. Hence these two methods simply illustrate different means of applying functional forces with the same object in view.

The question then arises as to which is the easier procedure and gives the highest percentage of perfection in final results. That can only be answered by evidence presented from year to year by men who have treated cases in these two ways and by comparing their results.

That it is possible for changes to take place in the temporomandibular articulation has been proved to me conclusively by cases of disharmony in the median line. In some of these the mandibular denture has been thrust to one side in order to establish better function. If these patients are treated at an early age, it is very easy, by simple expansion of the maxillary denture, to arrive at a period when the patient will suddenly pull back the displaced condyle into its fossa and automatically correct the median line disharmony. He can do this because there has been no change in the structures of the joint. On the other hand, if this same type of case is taken at an advanced age, it will not respond so satisfactorily to our method of treatment. There has been some modification in the articular structures on the side that has been constantly thrown forward. This could reasonably be an elongation of the condyle whereby there has been a replacement of this modified condyle in the fossa, and such a condition would block all efforts to correct the median line disharmony.

I should like to ask Dr. Rogers what is a reasonable percentage of success at his hands with this method of treatment. In other words, in what proportion of cases does he so positively establish the one bite position that there is no possible chance of recurrence? Second, I should like to ask what is the average length of time that must be devoted to this form of functional treatment of Class II cases. I think that these factors have a very important bearing upon the rationale of such treatment. We now know that we can move maxillary dentures distally and establish normal relationship of functional forces in a reasonably rapid period of time. From that point on, if these forces are established in a normal manner, our troubles of distal position are over. On the other hand, with the dual bite proposition it seems to me that it must be many, many months before one is sure that the patient is unable to relapse into the distal position of the mandible.

Dr. Stilson.—Quite a good many years ago, after adopting Dr. Rogers' method of masseter-temporal exercise I found after placing the arches in what appeared to me to be normal relation and arch form, and proceeding with the masseter-temporal exercises many of the children would come in and I would ask them to close their mouths. They would do it perfectly, in neutral position, and I would think that I had the case completed quickly and would feel very much elated. I would find a year or two later they were closing in a distal position. I discovered, as Dr. Rogers has shown, that they closed in the normal mesiodistal relation because they knew I wanted them to do it, and because I had asked them to do the exercise in that way, but they had what Dr. Rogers tells us is a dual bite.

I was using the Hawley bite plane at that time to some extent, but I found in many of my cases, those typical cases where there is a deep overbite, that I had been intruding the mandibular incisors as well as the maxillary, or extruding the premolars, whichever took place, and I found that the bite plane did not work because I had produced so small an amount of overbite that the mandibular incisors did not engage the bite plane sufficiently. Recently it has been my practice in these typical cases of a deep overbite, where the curve of Spee is very pronounced in the mandibular arch and is perhaps reversed in the maxillary arch, as is often the case, to produce what seems to me the correct arch form and proper arch relationship, and while doing that I have also intruded the maxillary incisor teeth and have tried to produce the proper curve of Spee. I have one of those templates, I think the periodontists call them, and I use that as a sort of gauge as to when I have obtained the correct curve of Spee, but I have not attempted to intrude the mandibular incisor so that the mandibular incisors would engage the bite plane well. Of course, when the mouth is closed, there is a lack of proper occlusion in the molar and premolar region, but I try to build the bite plane in such a position that they cannot close except with the mandible fully forward, fully as far forward as normal relation; then I rely on the Hawley bite plane to intrude the mandibular incisors or allow the premolars or molars to extrude as the case may be, and I have met with much more gratifying results.

Dr. Hellman.—I do not understand clearly why Dr. Rogers is looking exclusively for changes in the condyle in the treatment of those cases. Since I have been acquainted with Class II cases, orthodontists have always been talking about changes in the condyle. From studies on growth, it is reasonably clear that as the face grows forward it increases its dimension from the ear hole to the incisor region. Where the increase takes place is less clear. As the dentition develops, the centers of growth of the jaws, and particularly of the alveolar arches, are behind the last molar tooth, whether it is the first deciduous molar, or the second permanent molar. That is, in the maxilla the center of growth is in the tuberosity, and in the mandible the retromolar triangle. Growth in these centers is actually in a backward direction. The face, however, readjusts itself forward, carrying the teeth in front of the growth centers with it. But as the face adjusts itself forward, there is more growth in the alveolar processes than in the body of the jaw bones; therefore, the alveolar processes carrying the dental arches adjust themselves forward more than the rest of the jaw.

Now, in the course of growth, it is quite well established, that the distance between, for instance, the incisors and the condyle increases as growth takes place. Dr. Rogers is of the opinion that as the condyle slips back into the glenoid fossa there must be a change in that condyle. Has he examined the rest of the mandible and maxilla to see whether there is no other change taking place before harping on that particular point? The increases in these dimensions are very considerable. I presume that the treatment of these cases also takes years of time. But the important fact is that just at those periods of life there are very marked spurts in growth of the jaws.

I should like to ask Dr. Rogers whether he is quite sure that those growth increments which make it possible for the mandible to slip the condyle into the glenoid fossa are not very much more forward than the point he has been looking at.

Dr. Waldron.—Any one who has heard and read much of the subject of muscle training must feel, as I do, that the term "muscle training" is inadequate in expressing the thought we have in mind, namely the development of the muscles of mastication and a means, through functional therapy, of correcting the muscle tonicity, and maintaining the same, in order that it may retain the normal facial balance.

In discussing this subject with Dr. Lischer some time ago he suggested the term "myofunctional therapy." I believe this is a more descriptive term. If Dr. Rogers has no objection to its use in describing this adjunct to our orthodontic therapy, I hope we will adopt this or some more descriptive term than that which we now use.

Dr. Weinberger.—I have no intent to discuss Dr. Rogers' paper. It has been a remarkable presentation, but it has occurred to me, as I looked at the radiographs that were shown, that unfortunately the area was not sufficiently covered to bring out the point that I am always interested in looking at, as well as along the lines of the changes that Dr. Hellman has called attention to, and that is the change at the angle of the ramus. I should like to ask Dr. Rogers whether he has noticed any marked changes during the course of treatment after the ramus has settled again, and whether that change is not altered during the course of a number of years of function. I think that is one point about the angle that we have always overlooked, as to just what exactly takes place there.

Dr. Murlless.—I should like to ask Dr. Rogers whether he has ever used lead mouches on the tragal points for the purpose of orienting his admirable temporomaxillary radiograms.

I ask because for some time I have, in my Simon technic, been using mouches made of lead instead of from the usual black gummed tape. These thin lead mouches are reproduced as spots in the lateral jaw and anteroposterior radiograms and help to orient them with the photostat photographs and the gnathostatic models. It occurs to me that such mouches might be useful in the temporomaxillary radiograms as well.

Dr. Rogers.—In reply to Dr. Strang I would suggest that when instructing a child suffering from distoclusion to assume the neutral position where the head of the condyle is down on the eminentia we are merely making use of a variation of function, and this over a short period of time only. A large percentage of cases are successful, and some

very persistent cases have finally been successfully treated. The necessary time for treatment varies with the type of child and his responses to functional activity. The last illustration was that of a boy who has been under treatment for eleven months. Six months more will probably be required to complete his treatment.

Dr. Stilson referred to the persistence of dual bite. There are certain types in which this is true. Of course, the importance of arch form must not be overlooked. It is one of the first essentials in undertaking the treatment of distoclusion. When both arches have been brought to their normal size and shape, it is then essential to encourage the development of function.

I agree with all that Dr. Hellman has said. In my paper I suggested that I was not sure where all the changes in form occurred, but my best guess was that the major change would be found in the neck of the condyle. I think it is true, as Dr. Hellman suggests, that many minute changes take place in all parts under functional stress. I am looking forward to the time when some one, undertaking work like Dr. Margolis has shown us today, will be able to furnish us the means of measuring growth at all points. At present I am unable to say with authority just where the changes take place, but that they do take place is beyond question.

Dr. Waldron suggests the use of Dr. Lischer's descriptive phrase "myofunctional therapy." I like it much better than "muscle-training," a term which I have never liked and have seldom used, except as a title for one paper.

Dr. Weinberger's suggestion that the radiographs fail to cover a large enough area is valuable, for that is very desirable. The time will probably come when this can be accomplished, and we shall then be able to measure these changes in form throughout the entire area.

Dr. Murlless suggests the use of the lead mouche. Instead of using it I have used small stickers to indicate the measuring points. One point is not sufficient. It is necessary to have two constant points in order to make reliable measurements.

THE CRISIS IN ORTHODONTIA*

PART I

3. CRITICAL REVIEW OF THE PUBLICATIONS ON ORTHODONTIA BY B. GOTTLIEB, B. ORBAN, A. M. SCHWARZ, AND J. A. MARSHALL†

ALBIN OPPENHEIM, VIENNA, AUSTRIA

(Continued from 1178, December)

In regard to the critical review of the writings of A. M. Schwarz, I am in a more difficult situation than with the work of Gottlieb and Orban, since these latter authors were at least entirely objective.

One can refuse to accept proved methods or can recommend new ones only on the condition that a demonstration of new proofs based on the observation and experience of many years is offered. This rule, which has no exception and which applies equally to all authors, must, therefore, of necessity also apply to Schwarz; he cannot be conceded the privilege of making statements for which no proof whatever is given.

In his paper, "Tissue Changes Incidental to Orthodontic Tooth Movement" (INTERNAT. J. ORTH. 18: 331, 1932), Schwarz reviews "critically" my publications of 1911 and 1928; he also criticizes me in many other of his publications. I shall not, however, discuss all his misconstructions of my findings, since this would be too trying for the reader. I shall confine myself to pointing out only the grossest misrepresentations.

A summarized criticism of my histologic findings by Schwarz is to be found in Scheff's *Handbuch d. Zahnheilkunde* (6: 419, 1931): "... this schematized ideal picture that was wrongly interpreted in the textbooks of orthodontia, thus giving the practitioner in his technical manipulations an unrestricted feeling of security." I refuse to accept this statement because my findings are not a "schematized ideal" but are based on a careful study of histologic slides and upon consultation on these slides with authorities of first rank. My findings were misconstrued and incorrectly reproduced by Schwarz, and the effort was made to disprove them by the help of schematic drawings and fanciful interpretations.

In the textbooks of Korkhaus (p. 83), McCoy (pp. 156-173), Kronfeld (pp. 370-378), Strang (pp. 184-192), Izard (p. 394), we find without exception a true reproduction and interpretation of my findings, which none of these ever called unclear or schematic; in no textbook whatever or in any publication can one find any questioning of my statement that the bone transformation was performed *exclusively* by the activity of osteoblasts and osteoclasts. Schwarz, too, was quite intimately acquainted with my work, as can be inferred from

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the many quotations in several of his articles, as well as the direct statement, "the well-known histologic findings of Oppenheim" (INTERNAT. J. ORTH. 18: 334, 1932).

In his publications Schwarz intimates that I was unaware of the priority of Sandstedt's experiments. He states (Fortschr. d. Orthodontik. 1: 392, 1931): "Six years after the publication of Sandstedt appeared the well-known findings of Oppenheim. Being unfamiliar with Sandstedt's findings,

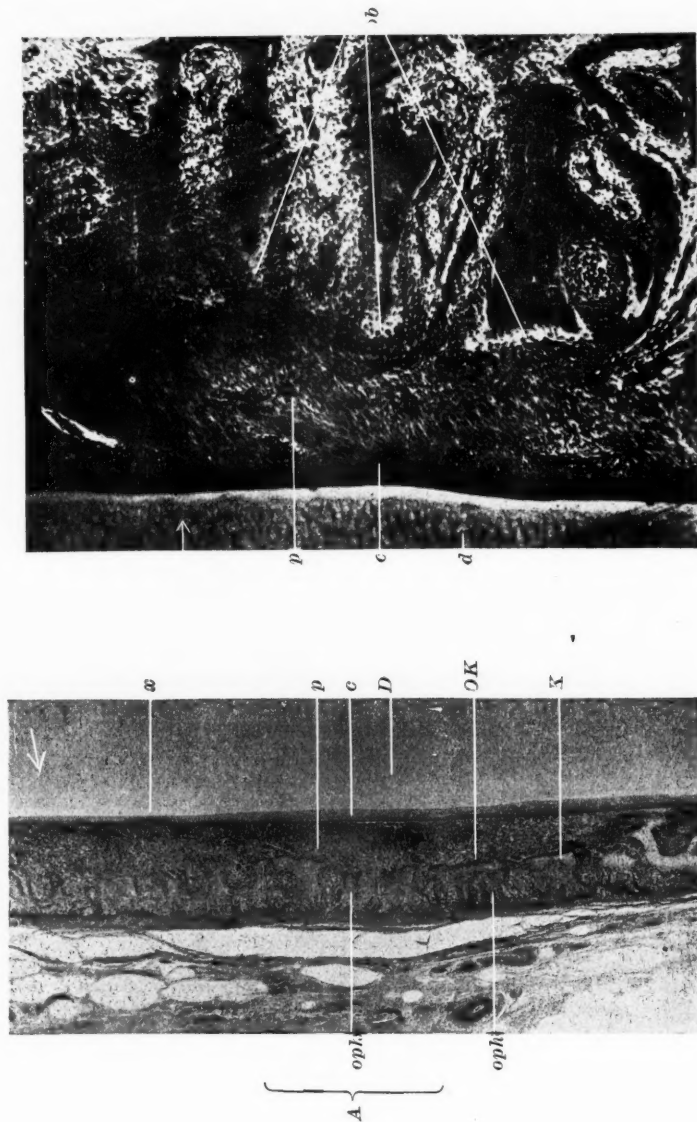


Fig. 7.—A, Labial movement, high magnification. The old bone (K) is, on the side facing the tooth, resorbed by osteoclasts (OK), while on the opposite side of the same bone (K) away from the tooth, there are developing in the direction of the force new bone trabeculae (osteophytes) oph; at x a very shallow resorption of the cementum (c); p, periodontal space; c, cementum; d, dentin; direction of movement indicated by arrow. B, Lingual movement, direction of force indicated by arrow; high magnification. The trabeculae are arranged in the direction of force; on the side facing the tooth they are lined with wide osteoid borders (ob); apposition exceeds resorption as intervals between adjacents become longer; in this field there are no osteoclasts. Cementum (c) intact; p, periodontal space; the periodontal fibers run in their normal direction from the bone downward to the tooth; d, dentin.

Angle considered them as the basis of our biologic thinking in orthodontic procedures and included them in his famous textbook. Therefore, these findings were considered by the profession as the first investigation of this kind."

This statement is in no way in keeping with the facts. My work on tissue changes appeared in English in the *American Orthodontist* (October, 1911, and January, 1912); therefore, Angle was familiar with it and also with

Sandstedt's work, which is extensively reviewed in my article, and my research work could not be considered by the profession as "the first investigation of this kind." I have never claimed priority.

Although Schwarz was aware of the fact that Sandstedt worked with strong intermittent forces, that is, with screws, he interprets Sandstedt's statements as follows:

Sandstedt (p. 22 and p. 161): "I cannot yet say whether those authors are right who recommend an intermittent, or those who recommend a constant pressure. At the present time I am merely able to show some anatomic observations relating to the influence of intermittent pressure on the periodontal tissues."

Schwarz's interpretation of Sandstedt's experiments (*Fortschr. d. Orthodontik*. 1: 388, 1931; *INTERNAT. J. ORTH.* 18: 331, 1932): "But in the first place, Sandstedt drew the screws only a little every day, so that the force used was practically constant."

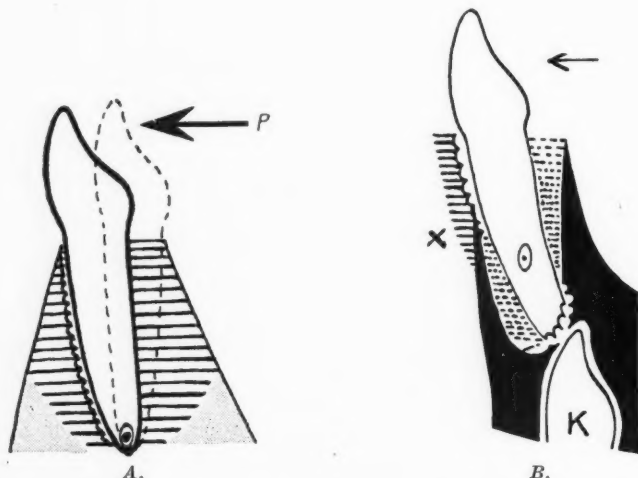


Fig. 8.—Misrepresentation of my findings by Schwarz by untrue interpretation by means of sketches (*INTERNAT. J. ORTH.* 1932, Fig. 4B, p. 334. and Fig. 9B, p. 339.)

A, "Theory of transformation (Oppenheim, 1911 and 1928) The tooth moved by the force, P, tilts around on axis, O, lying on the apex. Therefore there is only one side of pressure and one side of pull. On both sides the alveolar bone opens into a transitional spongy bone, whose elements are arranged vertically to the surface of the tooth (horizontal shading). On the side of pressure this newly formed transitional bone is resorbed (jagged line). On the side of pull new bone is added. Gray shading, the old untransformed alveolar bone, at a greater distance from the moved tooth."

B, " the newly formed osteophytes in the marginal region are resorbed. In the apical region of pressure the resorption was progressing both on the bone and on the apex of the moved deciduous tooth. In both regions of pull the deposition of the new bone trabeculae advanced So the alveolar bone seemed to be transformed both on the side of pressure and on the side of pull. . ." (Schwarz.)

Schwarz does not have the right to interpret the findings of Sandstedt, strictly qualified by the latter as "results of intermittent forces," as pictures produced by the action of *continuous* forces, nor does he have the right to call the force of the screw, hitherto considered by the profession as a true intermittent force, as a continuous one, merely because of its frequent renewal.

Sandstedt never worked with gentle forces, nor did he ever observe or describe the formation of new marrow spaces. Only by arbitrary changes and

misinterpretations of the findings of Sandstedt, or by additions to his original work published twenty-five years ago, was it possible to make it conform to the viewpoint of Gottlieb and Orban.

Schwarz (*Fortschr. d. Orthodontik*. 1: 396, 1931) writes that my slides of the labial as well as the lingual movement "show almost no signs of resorption" on the side of pressure (Fig. 7A) and that "all my slides show only the phase of regeneration and not the active response to orthodontic force" (p. 401). This statement is incorrect; Schwarz himself, in reproducing the slide under consideration (*INTERNAT. J. ORTH.* 18: 336 and 337, 1932) refers to the osteoclasts.

In the description of Fig. 7A Schwarz says (*Fortschr. d. Orthodontik*. 1: 396, 1931; *INTERNAT. J. ORTH.* 18: 336, 338, 1932): "... for the interpretation of this picture the latest investigations of Gottlieb and Orban give us the explanation. These authors . . . have found the following: on the outer surface of the alveolar bone, namely, on the periosteal side, arise so-called 'osteophytes' as a reaction of the bone to the excessive pressure. The elements of this new bone are arranged for the most part vertically to the surface of the jaw bone." This is another misrepresentation, for it was I who in 1911 gave for the first time a description of these "osteophytes," and Gottlieb and Orban have only affirmed these findings, which they concede in a footnote of their book (p. 38: "Such appositions of bone on the outer surface of the alveolar margin on the side of pressure were first described by A. Oppenheim").

In Fig. 8B the sketch (*Fortschr. d. Orthodontik*. 1: Fig. 13, 1931; *INTERNAT. J. ORTH.* 18: 339, 1932, Fig. 9B) is reproduced, by which Schwarz "interprets" the changes during labial movement in my experiments. Within three years these changes are described by Schwarz in a diametrically opposite way:

Schwarz (*Ztschr. f. Stomat.* 26: 65, 1928): "The histologic slides of Oppenheim of deciduous teeth of monkeys, moved by ligatures, showed the signs of most extensive resorption and apposition in the area of the alveolar margin. This process of resorption and apposition decreases gradually in intensity toward the apex and is not found at all at the apex itself."

Schwarz (*Fortschr. d. Orthodontik*. 1: 399, 1931; *INTERNAT. J. ORTH.* 18: 339, 1932): "In the apical region of pressure the resorption was progressing both on the bone and on the apex of the moved deciduous tooth."

This description by Schwarz in 1931 of the tissue changes is an incorrect interpretation of my findings. Just as incorrect is the statement by him (in describing Fig. 8B) that "resorption was progressing on the bone and the apex." I have always denied the existence of an apical "region of pressure," because when gentle forces are applied there is no movement of the apex in an opposite direction to the movement of the crown (*INTERNAT. J. ORTH.* 20: 252, 1934). I said of the slides in question (*Am. Orthod.* 1911, p. 67): "... the bone enclosing the root end shows no essential changes either on the labial or on the lingual side," and on another occasion (p. 116): "The bone surrounding the root apex shows no essential changes, either on the labial or on the lingual side, which would indicate the influence of pull or

pressure," and on pp. 129 and 131: "The tooth represents a one-armed lever and the apex of the root serves as the pivot point or center of motion. . . . In the bone in the immediate proximity of the root apex there were no changes observable."

In the same way is the schematic reproduction by Schwarz of my transformation theory in Fig. 8A untrue and by no means in keeping with the facts (INTERNAT. J. ORTH. 18: 334, 1932, Fig. 4B); this form of transformation I have never described anywhere, and I refuse in the most categorical way such a misrepresentation and depreciation of my findings.

My histologic pictures, designated by Schwarz as "complicated pictures which according to the knowledge then current of the biology of the alveolar bone and of the effect of the orthodontic appliances were liable to misinterpretation" (Fortschr. d. Orthodontik. 1: 406, 1931; INTERNAT. J. ORTH. 18: 341, 1932) and which he termed "highly confused," *have been made confused*

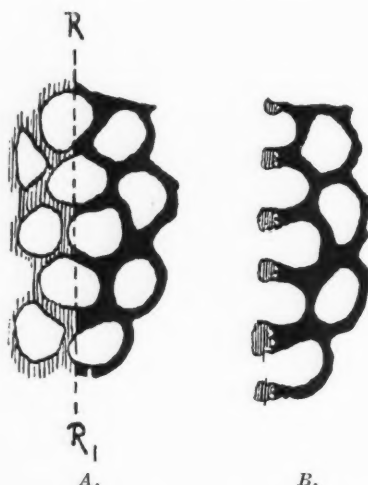


Fig. 9.—"Diagrams of Oppenheim's experiment of the lingual movement. A, Diagram of the lingual alveolar spongiosa which was resorbed along the line RR', while some marrow cells were opened. B, The opened marrow cells along the line of resorption with bone walls are arranged vertically to the tooth. The repairing apposition of osteoid tissue after fading away of the ligature activity is indicated by shading." (Schwarz: INTERNAT. J. ORTH. 1932, p. 340, C and D.)

only by his misinterpretations; everywhere else in the literature we find a true interpretation and correct reproduction of my findings, even by authors who take up a quite different point of view, but who are aware of the responsibility of scientific criticism.

In order to disprove my findings on the pressure side during lingual movement shown in Fig. 7B, Schwarz made sketches (Fig. 9) with the following interpretation "of the changes, as they actually take place" (Fortschr. d. Orthodontik. 1: 402, 1931; Scheff, p. 422; INTERNAT. J. ORTH. 18: 339-341, 1932): "The marrow spaces of the spongiosa were opened by the resorption, and in some stages the walls of these marrow spaces remained in a form similar to that shown in Fig. 9B. Of course, the wall consists of old alveolar bone, but Oppenheim described this old alveolar bone as a newly formed bone,

set vertically to the direction of pressure." By means of a sketch (INTERNAT. J. ORTH. 18: 340, 1932, Fig. 10E) he intends to show "how we must understand this picture today."

With reference to the histologic picture in Fig. 7B, which is no artificial product on my part and that does not need fanciful explanations and sketches to be understood, but which represents the natural and typical action of the bone to the forces of the appliance, I have stated (Am. Orth. 1912, p. 114): "The individual newly formed bone spicules, particularly those at the gingival third, have arranged themselves in the direction of the force, i.e., perpendicular to the long axis of the tooth. The ends of the spicules directed toward the tooth . . . showed broad, uncalcified zones."

I have also demonstrated by means of the specimens on retention (INTERNAT. J. ORTH. 20: 641, 1934) that this arrangement of the bony spicules in the direction of the force is a necessity, depending upon function. These are proved facts, for histologic photomicrographs are not schematic drawings, but illustrate facts.

The spicules arranged perpendicularly to the long axis of the tooth consist of newly formed bone and are not, as Schwarz says, "of course, old alveolar bone"; the schematic drawings and misinterpretation of Schwarz are by no means in keeping with my findings. The fact alone that these spicules are always arranged *perpendicularly* to the tooth and that the formation of osteoid never takes place on the inside of a marrow space but only on the functionally orientated cross trabeculae is proof enough of the correctness of my interpretation.

Schwarz states (Fortschr. d. Orthodontik. 1: 542, 1931): "The findings of Sandstedt were verified to the minutest details by the experiments of Gottlieb and Orban. . . . *The most important result is that when gentle forces are used, uniform resorption takes place on the side of pressure and uniform apposition on the side of pull . . . so that no noticeable loosening of the tooth takes place.*"

To this I might say that this "most important result" is only what I stated clearly in the *American Orthodontist* in 1911 on page 62: "The compact bone is undergoing resorption on the side facing the tooth," p. 67: "So we prove active bone formation on the side of pull," on p. 124: ". . . this characteristic transformation results only upon the application of very slight, physiological-like influences," and on p. 130: "The slower the movement is accomplished, the slighter will be the looseness of the tooth."

Schwarz, therefore, has neither enlarged upon nor restricted my results of 1911; he has merely ascribed them to other authors as "most important results."

(To be continued.)

Department of Dentistry for Children

A GENERAL PLAN FOR DENTAL HEALTH SERVICE

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IN READING over the preface to the first publication of "What Can Be Done for the Oral Machine,"¹ one finds certain definite statements intended to represent the status of dental practice ten years ago as I viewed it.

It is only fair, after such an interval, to invite the dental profession to report progress in the solution of the problems indicated in the preamble mentioned.

The first inquiry, naturally, would be in regard to caries, or odontoclasia; the second, as to pyorrhea, or parodontoclasia; and the third, without doubt, the status of the nonvital tooth.

Until an etiology, a pathology, a prognosis, and an outline of treatment have been established on a firm scientific basis, satisfactory to a majority of the members of the healing art, for each of the three major problems mentioned, we, as members of the dental profession, have no excuse for relaxation in our dental research.

Whatever we do, however, we should not allow ourselves to become in any way pessimistic as to results hitherto obtained. On the other hand, those of us who remember the limited accommodations provided for an oral hygiene section at the early meetings of the N. D. A. (or A. D. A., later), and contrast with them the programs for dental hygiene, or mouth health measures, arranged at the meetings the last few years have every cause for self-congratulation, if only for the widespread attempt to do something tangible on a health basis.

After ten years of practicing the methods indicated in the first publication of this system, I accept with much appreciation the invitation of Dr. Walter T. McFall to revise the work for republication. I feel certain that the principles outlined above, if carried out by every general practitioner in his daily practice, would inevitably prove to be of infinite advantage from the public health point of view.

It is only fair also to point out that if the one hundred millions of the American public who do not know the dentist and his work were educated by an enlightened profession on the lines indicated, there would ensue not only better health for the public, but vastly improved economic conditions for the dental profession.

In other words, to take all the steps necessary to restore health and function to a broken-down dental machine, is a much less restricted method of practice than the one usually adopted of dealing with teeth individually.

"Parts are not to be examined before the whole has been surveyed."

There must, however, be universal acceptance of this or an equivalent method, and universal cooperation in its practice.

INTRODUCTION

In presenting the accompanying plan for a dental health service, it will be observed that the term "dentistry" is omitted; for the reason that in the opinion of many, including myself, this term has represented hitherto a restricted practice, which to a large extent has failed to recognize and employ many factors indigenous to a state of dental health. If the term "dentistry" is to survive in the future, it must, like "medicine," be understood to include all the scientific groups of contributing subjects, a knowledge of which is essential to the successful carrying out of public health measures.

The problem of dental health and the solution thereof demand an intelligent appreciation of all the principles involved. In other words, any problem must be divided into the whole; the parts; the whole in relation with the parts; and the parts in relation with each other. It cannot be too vehemently asserted that recognition of the foregoing principle is most essential in any program which attempts to formulate plans for a real dental health service.

Extended experience in the dental field has made very clear, to one observer at least, the necessity for cultivating a new vision in dental practice, a new point of view or ideal, with, in turn, an entirely different training for the budding practitioner.

Considerable thought on the subject has enabled me to visualize several reasons why this change of objective is necessary for a successful administration of a dental health service.

1. There has been a lack of appreciation of the scope of dentistry in the health service field, and this fact has led to:

2. The development of a dental curriculum which has stressed altogether too much the acquisition of mechanical skills.

3. While there is doubtless a vast field for mechanical restoration, or dental repair, the main consideration of all oral lesions should be based on the *medical* point of view rather than the purely *dental* one.

4. This would entail the taking of case histories, personal histories, present complaints, and all the details necessary for a real diagnosis of each case, based on biologic principles.

5. Dental history to date is one long record of treatments of cases, rather than of causes—the *posterior* aspect of dental affairs rather than the *anterior*!

6. There are several factors which might well be considered as essential to the conduct of a dental health service. Such needs are:

- (a) An equal consideration of the odontium and parodontium, or teeth and supporting tissues, on a fifty-fifty basis; and not 98 per cent teeth and 2 per cent supporting tissues.

- (b) Early recognition of faults in development, viz., pits and fissures, in teeth.

- (c) Much earlier than usual recognition of gingival or gum conditions, mouth complexion, etc.

(d) Earlier recognition of alveolar disturbance, as shown by abnormal mobility of teeth on clinical observation, or of alveoloclasia through the medium of x-ray.

(e) There is need for the medical profession to recognize lesions of the oral cavity as indices of general systemic disorders, in other words, to utilize the oral cavity for diagnostic purposes. As a corollary to this there should be an extension of the medical training to include a more intimate acquaintance with mouth conditions.

(f) There is need for courses on mouth health for the medical nurse of all grades, especially the public health nursing staff.

(g) There is great need for much more cooperation among all branches of the healing art.

(h) A more definite and inclusive health program in all the states of the Union,

(j) and this includes an agreement among all health boards and school boards, in the adoption of a definite health policy for both urban and rural districts, etc.

7. In any undertaking which has for its object the revision of traditional practices, it is essential for success that the author of such a scheme present the subject in such a way that a clear mental picture is formed by the readers of papers or audiences at lectures. In this instance the reader is invited to consider what are the necessary requirements for any piece of machinery in order that its specified functions may be carried out efficiently; and having arrived at that point to translate the ideas formed into terms of the teeth and supporting structures, of the "dental machine."

As in any machine, so in the dental machine, it is necessary for function or smooth working efficiency that:

- (a) the framework be well built to stand stress;
- (b) the dental units be in alignment to ensure smooth working;
- (c) the parts be cleaned and lubricated;
- (d) a certain amount of repair be undertaken when required, to restore health and function to a machine when it is broken down.

8. We should all keep in mind that the aforesaid four factors must be considered in all cases, by every general practitioner daily. By so doing, the danger of missing some factor in etiology, however subtle or obscure, will be lessened.

We should also remember that it is probably true that no one factor ever causes any disease. For instance, A and B may be exposed to the same infection. A succumbs; B does not. Why? Because the powers of resistance are adequate in one case (B) and not in the other (A); thus we have the factor of infection and the factor of resistance.

9. A diagnosis, prognosis and outline of treatment should be presented to each patient in all seriousness; and the all-pervading method of "fixing" teeth individually and without reference to the dental machine as a whole must be discarded if the general public is to acquire a long-felt want, viz., a real dental health service.

It is time that the dental office became a health center, and not just a repair shop.

10. This general plan for a dental health service, based on the charts which I compiled for "What Can Be Done for the Oral Machine,"¹ is presented for the consideration, especially, of the general practitioner, as he must always be a prime mover in dental affairs and their development.

Let it be thoroughly understood, however, that the present scheme or any other which calls for new vision in our professional ideals, must engage the cooperation of all hands; otherwise we can never escape from the rut into which we have fallen or dispel the fog of uncertainty which has hampered visibility for all those in search of a more rarefied atmosphere.

We shall consider prevention rather than cure, except in the section on "Your Patient," which is introduced as illustration of what can be done in the way of restoring health and function to a broken down machine.

OUTLINE OF GENERAL PLAN FOR DENTAL HEALTH SERVICE

- I. Building, or Nutrition
- II. Fitting, or Occlusion
- III. Cleaning or Hygiene

I is subdivided into

(a) Educational, (b) Practical.

(a) There are infinite possibilities for education of the public by physicians, dentists, medical nurses, dental hygienists, teachers, and social service workers, in daily association with the public.

Contacts on a vast scale could be made through the department of public health and the many subsidiary groups in immediate connection with that department, such as:

- The advisory Committee on Adult Hygiene,
- The advisory Committee on Maternal and Child Hygiene,
- The advisory Committee on Dental Hygiene,
- The advisory Committee on Public Health Nursing,
- The advisory Committee on Social Service,
- The advisory Committee on Nutrition,
- The advisory Committee on Tuberculosis.

There might be a Central Health Council composed of many groups, such as:

- Association of Boards of Health,
- Association of Public Health Nursing,
- Medical Societies,
- State Nurses' Association,
- American Red Cross,
- Association of Hospital Social Workers.

Educational work could be carried out through public campaigns, lectures, motion pictures, newspapers, and exhibits.

An organization such as the Dental Hygiene Council (Mass.) could formulate a comparatively simple program, present it to one or two of the

groups previously mentioned, and through unanimity of purpose and close cooperation of all hands force these undoubted truths into the public mind.

But all must be in accord and all branches of the healing art must cooperate. The program must be simple; for if too much is attempted, the issues become involved.

(b) The practical side resolves itself into, largely, a diet scheme, in turn subdivided into periods for consideration, such as: prenatal; birth to two years; two to six years; six to sixteen years; and sixteen to twenty-five years, which latter is a suggested plan for dental health service to be applied to "Your Patient." These periods, in detail, will be dealt with later on.

II. Fitting, or occlusion, in the general plan:

(a) Educational, (b) Practical.

(a) Confined to an early recognition of signs of malocclusion, i.e., lack of separation of incisor region; excessive overbite, etc.; any harmful habit, such as thumb- or finger-sucking or mouth-breathing, should be noticed and prevented.

(b) Here we must consider the mother's diet during pregnancy for development of tooth tissue and also the diet of the child after birth. After the deciduous teeth are in place and there are decided symptoms of malocclusion, elementary orthodontia or dental orthopedics may be practiced with success. Later more advanced orthodontic procedures may be indicated for malocclusion or for traumatic occlusion—always a factor to be looked for. It may be necessary in some difficult cases to entertain the idea of extraction, either of too long retained deciduous teeth; or in special cases it may be advisable to remove certain permanent teeth, always provided that such operation is of a symmetrical character and is justified by conditions. This is a vexed subject, but from considerable experience in that field in bygone years, I feel that more attention should be given to that aspect of orthodontia. Conservative practice, of course, is to be desired; but facts in the evolution of *Homo sapiens* with reference to the development of the superior and inferior maxillae, indicate a widespread inability to provide room for thirty-two teeth in anything approaching physiologic occlusion. The third molars are frequently impacted, are the source of much distress, and have to be extracted in countless cases. Often, too, the third molar is a better built tooth, with half a chance, than the first permanent molar.

III. Cleaning or hygiene, in the general plan for dental health service:

(a) Educational, (b) Practical.

(a) Dating from the time that the Cro-Magnon man discovered fire, and used it for cooking food, thereby coagulating albuminous constituents of food-stuffs, there has been trouble in the cleansing or hygiene of the oral cavity. Creamy exudates of insoluble food particles, carbohydrates, and proteins have been plastered onto the surfaces of teeth and gums by the mucin element of saliva. Films or plaques consisting of a network of agglutinin, lime salts, dead epithelium, putrefying and fermenting food particles, with myriads of

bacteria are formed. Deposit formation includes salivary and serumal calculus. These with stains and tongue conditions will be given in detail later.

(b) Practical. In this category there are (1) the office practice and (2) the home measures.

1. Odontexesis, which means "teeth polished by scraping, filing and planing," should be carried out at regular intervals; also apexesis, meaning root surgery, if necessary, by skillful operator. Toothbrush drills, prophylactic fillings or silver nitrate treatment, prophylactic odontotomy (Hyatt), cavity fillings, etc., will be dealt with later.

2. The use of the right kind of toothbrushes, or mouth cleansers, pastes, powders, mouth washes, massage, etc., will be described later.

BUILDING, OR NUTRITION

(a) Educational, (b) Practical.

(a) (1) Physicians who realize the significance of mouth conditions in a complete physical examination, and there are more and more who do realize it, will find therein an important reinforcement in the scheme of general diagnosis, prognosis, and treatment. It will in all probability be proved beyond speculation *that all major systemic diseases have indices in the oral cavity*. But the medical school curriculum must be extended to include a more than nodding acquaintance with the oral cavity. In this respect it is only fair to claim that many physicians or surgeons in getting the mouth of the patient opened, see nothing in that mouth anterior to the tonsils. It is equally true that many dentists on looking into a mouth see only teeth. (N. B. It took many years of practice before I was really aware of the supporting structures of teeth or adopted any preventive or curative measures.)

The foregoing principles can be carried out by physicians in daily practice with individual instruction of the laity; in lectures on general hygiene and diet; in papers read before professional societies; and in pamphlets circulated through the departments of public health, or any one of the many subsidiary health organizations mentioned in the outline of this scheme.

(2) Dentists, in their daily association with patients not only have a wonderful opportunity to render a real health service, provided, of course, that they have developed a new vision of dentistry, but also by the adoption of the plan of treatment outlined herein would find a great deal more to do, with the obvious result! It should be understood generally that about one hundred million of our population not only are ignorant of a dental health service, but have little or no acquaintance with any kind of dentistry. Here is a vast field for missionary work—the salvation of the dental machine.

Not only in their practices can they spread the gospel, but at dental meetings, the oral hygiene and nutritional sections can serve as the arena for lectures, discussions, and papers on the subject.

Dentists, if they will, can also cooperate with the physicians and all members of the healing art; in fact, they must do so for a successful issue in the cause of health.

(3) Dental hygienists, if properly trained, should be a powerful addition to the ranks of health workers. Having spent eight years in teaching undergraduate dental hygienists I have evolved very definite ideas as to the training and scope of the dental hygienist.

Her field should not be confined to the activities of the dental office, with cleaning or "scrubbing" teeth as the sole objective. The educational aspect of her duties is of far more importance to the community from the health point of view. She should give advice on nutrition to patients (suggestions) and mouth cleansing, and mouth health talks to mothers and children. As one of the units in community health centers, the dental hygienist can be a power for good. Another important phase of activity is as possible instructor on the subject of dental health to pupils in normal schools. After graduation the school-teacher will be able to reflect this instruction in daily health talks to the children as an integral part of the general health program. The rôle of the dental hygienist in institutions and industrial centers should not be neglected.

One of the main difficulties in the progress of the dental hygienist is her abbreviated training, in many instances only one college year. If the course could be extended one or two years, there would be no doubt as to the status of the dental hygienist in the public health field.

Miss Cora Ueland, one of the best known figures in dental hygiene circles, gives an interesting summary of outstanding duties of the dental hygienist:

"First, her greatest field of service is in the public schools, in which she does principally educational work. Second, in country or state health work. Third, in hospitals and similar institutions for diseased and abnormal people. Fourth, in mercantile and industrial concerns. Fifth, in the private dental office or in dental clinics, and sixth as supervisor in schools for training dental hygienists."

(4) The medical nurse should undoubtedly be enlisted in the ranks of mouth health workers when one considers the numbers of patients in the hospitals and private homes confined to bed and dependent on the nurse for all the necessities indispensable to a sick-bed existence, including mouth care.

Many such patients are hanging onto life by a thread; and that thread is kept taut by the nourishment which passes through the oral cavity. It does not require a very elastic imagination to realize the difference in the value of such nutrition if the pabulum is obliged to pass through an unhygienic area on the way to the esophagus. In her talks on health, the medical nurse or the public health nurse can do untold good if she is properly impressed with the value of mouth health. Incidentally, when one realizes the position of the oral cavity in relation to the entrance to two of the most important systems of the body, viz., respiratory and digestive, it is difficult to conceive of a neglect to keep the approach at least clean and hygienic.

(5) Social workers have far reaching possibilities in their contacts with all kinds of people, especially as their duty is to leave no stone unturned in the pursuit for amelioration of living conditions and health measures.

Other groups with possibilities for successful health propaganda may be mentioned: teachers, parent-teacher associations, and women's clubs. In

fact, there is no end of possible contacts, and intercommunications on health subjects. The main thing is to make people mouth conscious to the extent that they now appear to be ear conscious.

Facts are stubborn things, and it is undeniable that in the public mind, except for relief of pain and extraction of diseased teeth, dental work is considered more or less a luxury.

There is a long hard road to cover before the correct mental attitude can be attained with dental health service taking the place of dentistry as understood by the large majority. And this can be fostered only by the adoption of a program sufficiently simple and definite to be beyond the possibility of controversy. Furthermore, such a program must be adopted by all the component groups concerned with the healing art.

(b) Practical measures to aid in the building of an efficient dental machine must be taken at the earliest possible period. The prospective or actual mother must realize that the oncoming child is dependent upon her for both physical and mental development. To ensure the best results both parents of the growing child must observe all the rules of right living, viz., the right kind of food, hygiene, exercise, rest, fresh air, and relaxation for the normal functioning of the body cells.

Of course, a special responsibility rests upon the mother's shoulders because normally the child depends solely on her for his nourishment during the greatest growth periods of his life, the prenatal and nursing periods.

The digestion should be carefully considered. Old superstitions with regard to the loss of teeth in pregnancy and the dangers of dental procedure should be banished. The advice of the family physician or pediatrician, in cooperation with the dentist, should be sought during the entire period of pregnancy. The physician to a large extent should select the food supply; while the dentist sees that the port of entry is kept hygienic. In fact it may be considered a serious thing and entirely apart from the field of dentistry as at present taught, to advise individuals in regard to diet because (a) in obscure diseases, even in apparent health, something may be wrong with metabolism; (b) during pregnancy excess lime may affect the kidneys, etc.; (c) babies and young children are affected differently from adults and are more susceptible to variations.

Therefore no dentist, dental hygienist, dietitian or any one but a physician who is conversant with the individual's physical condition, limitations and reactions, should ever advise in detail as to changes in diet, especially during any critical period of life.

The question of the advisability of any changes in diet may properly be brought to the attention of patients by dentists, and they should be advised to consult their family doctor or a specialist.

This division (b) in Section I is concerned mainly with diet or nutrition; and subdivided into: (1) prenatal, (2) birth to two years; (3) two to six years, and (4) six to sixteen years.

(1) Prenatal. A mixed diet is best for the prospective mother. Milk, vegetables (especially the leafy varieties), fruit, some meat, and whole wheat bread or cereals, constitute a foundation for a diet which at first should

stress quality rather than quantity. It must always be understood that a diet is an individual matter, and is likely to vary considerably in relation to personal susceptibilities or allergies. Certain fundamental principles can be insisted upon, however, in most cases.

During the first five months of pregnancy food should be provided on the terms outlined, but during the last four months there must be a definite increase in amount, at least one-fifth more.

Building of the dental machine in common with the rest of the body needs lime, phosphorus, and vitamins, especially vitamins A and D. These elements can come only from two sources, the mother's food or the mother's tissues. If the right amount of the right kind of food is not taken and assimilated, then Nature makes a raid upon the tissues of the pregnant woman; in other words, the baby is taken care of regardless of cost.

If it is true that "many a set of teeth is ruined at birth," we can readily understand the paramount necessity for biologic consideration of diets.

May E. Foley, nutritionist writes: "In order that the expectant mother may provide the very best conditions for the child to be born—and for herself—she must understand the food needs of a normal woman. Foods are divided into three classes—Growth, Energy, and Regulating foods."²

Perhaps no other group of foods is so little appreciated as the regulators. They are water and the foods which contain large amounts of minerals, vitamins, and roughage.

Growth foods

- A. Milk
- B. Meat (lean), fish, eggs, cheese, dried peas, and beans
- C. Vegetables and fruits

Energy foods

- A. Milk
- B. Cereals and cereal products
- C. Sweets
- D. Fats

Regulating foods

- A. Milk
- B. Vegetables
- C. Fruits
- D. Water

A diet for the pregnant woman is suggested by Dr. C. L. Drain, Iowa, as follows:

"These foods should be eaten every day:

- 1 quart of milk
- 2 eggs
- Meat, fish, or chicken, one serving.
- Fruit—twice daily—preferably fresh.

Vegetables—two servings daily.

Class 1. Peas, carrots, turnips, beets, parsnips, onions, egg plant, squash.

Class 2. Lettuce, spinach, tomato, celery, cauliflower, cabbage, asparagus, chard, string beans.

Both vegetables may be chosen from Class 2, only one from Class 1.
Cod liver oil—one teaspoon.

Other foods to supply bulk and variety as desired.

“The above diet is suitable for the lactation period with the exception that milk consumption should be increased to *two* quarts daily. Any food which causes gas or other distress should be avoided. Vary the food from day to day to avoid monotony. See that all the elements are provided. Masticate all food long and thoroughly.”

(2) Birth to two years. This period of existence should be subdivided into two parts: (a) birth to ten months, further subdivided into breast-fed baby and bottle-fed baby; (b) ten months to two years.

The breast-fed baby. Breast feeding is most desirable in that it gives the best start; and most mothers can nurse their babies, with perseverance, viz., taking care to have the right kinds of food, as described previously.

The baby should be nursed at regular intervals and should not be weaned because the milk is “too rich.” If that is the case, give the child one or two ounces of boiled water before each nursing, and nurse for a shorter time. The mother should take less of cream and sweets and should exercise more every day.

Give the baby cool, boiled water between feedings when he is awake. Prepare him for weaning by giving at eight months one bottle each day in place of one breast feeding and gradually increase the number of bottle feedings until the baby is weaned. Teach him early to drink from a cup.

The bottle-fed baby. If the baby must be fed artificially, the best substitute for mother’s milk is properly modified cow’s milk as prescribed by the physician. Be sure of a clean milk supply. Pasteurized bottled milk is safest. Keep the milk clean, cold, and covered. Boil the milk five minutes in preparing the formula; boiled milk is safe and not constipating if the baby has plenty of water and some orange or tomato juice daily.

Feed the baby regularly every three or four hours, as recommended by the physician. No feeding between meals.

At one month give the baby twice daily one teaspoonful of orange juice strained and diluted with a teaspoonful of water. Increase the amount of juice gradually so that at three months the baby is getting one tablespoonful of juice twice daily.

If fresh or canned tomato juice is used, twice as much is necessary and may be used undiluted. Prune juice does not take the place of orange or tomato juice.

At five or six months, give tested cod liver oil. Begin with one-half teaspoonful twice daily. Gradually increase the amount up to 2 teaspoonfuls twice daily at four months, except in summer when sun baths can be given.

Some pediatricians recommend giving egg yolk at five months, some sooner; about one-fourth teaspoonful of yolk is given at first. This may be soft cooked, hard and mashed, or coddled. Increase the amount so that at one year, the child is getting one whole yolk daily.

Summary of foods other than milk for the baby up to ten months:

Orange or tomato juice
Cod liver oil
Egg yolk
Cereal
Vegetables
Dried bread crust
Unsweetened zwieback

From ten months to two years:

1. Wean the baby in tenth month.
2. Be sure of a clean milk supply.
3. Boil the milk if you are not sure of clean milk.
4. Use quart of milk daily.
5. Keep milk clean, cold, and covered.
6. Keep flies away from food.
7. Give the baby water to drink between meals.
8. Add new foods gradually, only one at a time, and in small amounts.

At twelve months a child should weigh three times his birth weight, and he should be gaining.

(3) Two to six years. The preschool child.

The child is growing fast, is constantly running and playing. The food must be adequate for building and for energy. The simpler the foods the better; increase the amount slowly, adding new foods one at a time. Each child's needs vary according to heredity and environment.

Meals should be served at the same time each day. A rested child eats more heartily. Amounts of food vary according to age.

Use these foods:

Milk. One and one-half pints to 1 quart daily. Two or three cups may be drunk, the rest may be used in soup, puddings, etc.

Fruit. Raw fresh fruits, scraped at first, may be given on eruption of all the teeth. Orange juice, stewed prunes, apple, pear, ripe banana, peaches and apricots.

Vegetables. Four to eight tablespoonfuls at least once daily. Green leafy vegetables at least three or four times weekly. Lettuce, celery, cabbage, carrots, tomatoes, and spinach may be given raw in small quantities when the child has learned to chew. Kale, chard, beet greens, squash, peas, beets, and asparagus may be given. Vegetables should be cooked without meat, in boiling water, as rapidly as possible. Dried beans or peas may be fed in purée.

Potato. Two to 8 tablespoonfuls mashed, or 1 small potato baked or boiled in skin.

Cereal. About $\frac{1}{2}$ cup once or twice daily. Whole grained such as oatmeal, Pettijohn, Wheatena, Ralston, Cracked Wheat, cooked thoroughly, free from lumps, or Shredded Wheat.

Bread. One to two days old. Whole wheat, rye, graham, corn meal, and oatmeal are best. White bread made with milk is good.

Egg. One may be given daily in some form. The yolk is the most essential part.

Meat. One to two tablespoonfuls about four times a week. Beef, lamb, chicken, liver, kidney, fish (cod or haddock), cottage cheese, and crisp bacon.

Butter. From one level teaspoonful to one tablespoonful at meal on bread or vegetables.

Simple desserts. Puddings of bread, cornstarch, rice, and tapioca, prune whip, custard, junket, fruit gelatin, stewed fruits, cookies (molasses, plain sugar, or graham), bread with jelly, honey, or molasses.

Water. About four glasses—before breakfast and between meals, not to wash down food.

Tea, coffee, beer, wine, fried foods, pie, pancake, nuts, rich puddings, fat meat, and gravies are not to be given. Fruits and simple desserts should take the place of candy.

(4) Six to sixteen years. The child of school age should have the plain wholesome diet of the average family. There should be, however, a strict injunction made against candy between meals, if for no other reason than the fact that when a boy or girl is filled up with chocolate, there is no room or inclination for spinach or the various kinds of food which do the most good.

In a diet for the average child six to sixteen years, the following should be taken every day:

- One quart of milk
- One or two eggs
- One serving of meat, fish, chicken or liver
- Two vegetables
- One orange or tomato or apple
- One fruit in addition
- One teaspoon of cod liver oil
- Six teaspoons of butter

Other foods, as bread, cereal, and potatoes, may be added to satisfy the appetite and to maintain the correct weight. The child should be weighed every week and any loss noted carefully. There should be no eating between meals, except fruit or milk.

Undesirable foods are spices, coffee, tea, pop, pickles, rich pastries, dried meats, dried beans, and fried food.

The adolescent girl's requirements for blood are increased: foods providing iron must be given:

- Liver and meat
- Green leafy vegetables
- Eggs

Whole grain breads and cereals
Dried fruits
Dried beans
Molasses

The boy's requirements for quantity of food are increased. A normal boy of fifteen years will eat more than his father. He is growing rapidly and is expending a lot of energy.

FITTING, OR OCCLUSION

(a) Educational, (b) Practical.

(a) A slogan of special value in this section is, "Parts are not to be examined before the whole has been surveyed." S. Johnson.

As before, all members of the healing art and of social service who are interested in the prospective mother should preach the gospel of right feeding and right living generally. The diet should supply the essentials for development and growth of the skeleton and teeth. It should be remembered that malnutrition of the mother may lead to (a) actual loss of tooth germ, (b) imperfect development of tooth substance, and (c) malocclusion (of child).

We are now specially concerned with the fitting of the parts of the dental mechanism; and we wish to point out the dangers of inattention to such advice as is given here, with respect to measures taken to induce a physiologic occlusion. It is lamentable that about 90 per cent of human dentitions are not in correct alignment. After twenty years' experience in collecting models of adult dentitions, I have found a bare half-dozen dental machines which measure up to the requirements.

Mothers, and possibly fathers, can be educated to realize that as an irregular set of teeth is due probably to want of development or to disease of the first dentition, not the second, it behooves the guardian of a child's welfare to see that the baby's teeth are cared for wisely.

When the set of twenty "pearls" is in evidence, the teeth should be cleaned and exercised—careful brushing after eating and gum massage should be practiced. The food should be coarse and hard enough to require thorough mastication.

This gives the right kind of exercise and stimulates development of the jaws and supporting tissues. It is wise at any time after the second year of life to enlist the services of a competent dentist to examine the child's teeth periodically. But a parent should be capable of observing certain facts about the child's mouth. For instance, when the child is five or six years old, look for the eruption of the first permanent molars, which frequently emerge through the gums without any "flourish of trumpets," and being next door to the second deciduous molars are frequently taken for deciduous teeth by unsuspecting mothers; and in many instances are allowed to decay before their very eyes.

To summarize:

Diet for mothers is a mixed one containing: (1) in the prenatal period, all the essentials for growth of the skeleton and teeth; (2) in the nursing

period, plenty of milk, leafy vegetables, whole wheat bread and cereals, fruit and water; (3) for the child, breast feeding, weaned at about tenth month, with gradual addition of hard foods as the teeth erupt. As the child grows older, food should approximate the reasonable mixed diet of protein, fats, carbohydrates, mineral salts, vitamins, and water. All food should be well masticated.

The parents should watch for early signs of malocclusion, such as:

- (A) Lack of separation in incisor region
- (B) Deviation of median line
- (C) Excessive overbite
- (D) Open-bite

(b) Practical. Look out for and prevent (a) thumb-sucking, (b) finger-sucking, (c) tongue-sucking, (d) lip-sucking, (e) pacifiers.

Routine office work, such as odontexesis, etc., should be undertaken at regular intervals to prevent:

- (1) Loss of masticating power
- (2) Caries
- (3) Malocclusion
- (4) Periodontal lesions
- (5) Nervousness
- (6) Poor scholarship

This should be followed by cooperation at home after meals and before retiring. It may be necessary to prescribe dental orthopedics or early orthodontia.

Orthodontia for malocclusion and traumatic occlusion. Correction of traumatic occlusion by grinding teeth, or exodontia in individual cases.

The factor of exodontia has been referred to before, and is a matter for very serious consideration, the opinion of the ultraconservatives, notwithstanding.

A great deal might be said with reference to this very important section, but there is a limit to the space for this article, which is inevitably of considerable length; and it should be understood that I am writing chiefly for the general practitioner and would not presume to outline any special system of orthodontia in such company. It is painfully evident, however, that treatment of malocclusion for the masses does not exist.

CLEANING, OR HYGIENE

(a) Educational, (b) Practical.

Continuing our plan of building and upkeep of an efficient dental machine, we come now to the very important factor of cleaning and lubrication of the parts.

This latter duty, lubrication, is carried out by the action of the fluids of the oral cavity; and while this feature may concern mainly the adult mouth, we think it worthy of inclusion and will deal with this matter later.

(a) Educational. We should all realize that food deposits form as creamy substances between teeth and on occlusal surfaces; and that such deposits are

insoluble, because the heat of cooking coagulates the albuminous content of the food. In addition to these insoluble deposits of foodstuffs between teeth, there is formed a network of a gelatinous sticky nature in which dead cells, bacteria of many varieties, and decomposing and fermenting food particles collect on the surface of the teeth. This agglutinous network is known as a "film" or "plaque."

Terms in common use, too, in describing oral deposits are "tartar" and "calculus"—salivary and serumal. These terms are likely to be used in a far from definite way; and as a matter of fact there is a direct sequence of events in formation of tooth deposits commencing with a "film" perhaps, and ending with "serumal calculus"; and the borderline between etiology and clinical significance thereof is shadowy.

For teaching purposes I have been in the habit of using a certain mental picture to describe the series of events in tooth deposits: A snow flurry in November covers the ground, then melts; but later on that night may freeze. Thus a thin layer of ice is in immediate contact with the roadbed, and any dust or rubbish particles already in place will be glued onto the roadbed. On the surface more dirt and dust are incorporated. Another snowstorm, more melting and freezing! Another layer is built up, and another, and still more, for several months perhaps. The innermost layers are driven more and more into intimate relation with the roadbed by constant traffic, with the result that, finally, it is difficult to distinguish roadbed from deposit.

In the oral cavity this process is described vividly by the late Dr. J. J. Sarrazin of New Orleans: "Infection at gum margins is preventable; and there again the greater danger is located at the necks of teeth and interproximally, in films of dried mucus mixed with dead epithelial cells, bacteria, and thin creamy exudates from mastication, to form an ideal culture medium with warmth and moisture. Lime salts lodge into the infectious films so formed and become hard masses."

Thus we see a conglomerate mass of films, lime salts, and bacteria; more films of mucinous network, more cells, more bacteria, more lime salts, et cetera. The result may be called "salivary calculus," is of a light color, and is friable.

The formation of "serumal calculus" is pictured by Dr. Sarrazin: "At first their toxins of streptococcus and staphylococcus irritate and congest the marginal gingivae, cells are opened to the penetration of the streptococci, followed by the destructive staphylococci; minute capillaries break, leucocytes exude and decompose to form pus; while the phosphates and urates from the liberated plasma mix with bone cells disintegrated by the pus to deposit on roots and into cemental pits, bared by the suppurative destruction of the pericementum . . . it is the same old and unchangeable march of infection, congestion, inflammation, and suppuration, that manifests in the oral mucosa exactly as it does anywhere in the body, except that roots with exposed cemental pits are present to retain the foundation layer of phosphates and urates of lime and soda to build "serumal calculus," which in turn is an irritant, being built by infective processes—just ordinary etiology and pathology, and the process reaches deeper and deeper until dental periclasia leaves no bone to support roots." In contradistinction to salivary calculus the serumal variety is likely to be

very hard, tenacious, and dark in color, owing to the hematin of the hemoglobin element of the blood serum. But the borderline is dubious, and roughly speaking we describe salivary as above the gum margin and serumal as below the margin.

It should be understood and taught extensively that the progress of disease outlined above is liable to vary according to the presence or absence of factors such as individual power of resistance and biologic conditions generally. A pamphlet has been compiled by the American Academy of Periodontology entitled "What Bacteria Do in the Mouth." (Dept. of Dental Health Education, A. D. A.)

In addition to deposits on teeth and gums, the various stains should be considered; and incidentally, there is need for much more research into the etiology of the stains of varied hues ranging from red to yellow—to green and to black. These are liable to be the despair of the conscientious dental hygienist, especially black lines.

In direct sequence with teeth deposits, etc., comes a consideration of the tongue. This organ, so unruly at times, is in relation anteriorly and laterally with teeth, and posteriorly is in immediate relation with the tonsils. How easy to trace a path of infection from dirty teeth to tongue, to tonsils, to larynx, to trachea, and to bronchi and lungs; or to pharynx, esophagus, stomach, and intestines! One should recollect the anatomy of the tongue, and the crypts and innumerable pitlike openings capable of containing large quantities of food débris and bacteria. In fact, a scraping from the posterior third of the dorsum has been tested to show almost a pure streptococcus culture. In children, owing to better circulation and elimination, the deposits are not so marked. The tongue should be kept clean—is it? It is not! A good slogan in this respect is: "The mouth is the gateway of life; keep it pure!"

As part of our educational scheme, it is certain that the function of lubrication of our dental machine should have more consideration than is given, as a rule, to that process; and I am taking the liberty of using part of some material which I compiled for publication in the *American Dental Surgeon*³ (a journal no longer published). It should be realized that in a healthy oral cavity (adult) the amount of fluid secreted is from four to six pints daily, but this amount is variable. The contents of saliva are, probably, sodium, calcium, and magnesium phosphates; sodium and potassium chlorides; a ferment, ptyalin; mucin; and water. This fluid should have an alkaline reaction; but it must be remembered that the content of saliva is likely to vary with the general health of the individual, conditions depending on the digestive system, and the way, more or less perfect, in which food is assimilated. In other words, *metabolism* must be studied. There are several diseases of a systemic nature which affect saliva for the worse. The alkalinity of the saliva shows remarkable variation according to the various stimulations to which it is hourly subjected. A sapid substance, and especially that of an acid kind taken in the mouth, is likely to cause a profuse secretion of saliva from the parotid, submaxillary and sublingual glands. The sight of food, the smell of cooking when one is hungry, the sound of the dinner bell—all cause an increased flow of saliva—they make one's mouth water.

The reasons for enlarging on this subject are (a) that it is very important that this secretion should be kept in good condition because of its protective influence on dental tissues; (b) that dental caries often accompanies dry mouth; and (c) that the constituents are likely to vary considerably. It is also true that this phase of dental upkeep is not discussed very much in the textbooks.

(b) Practical, subdivided into (1) at office and (2) at home.

(1) At office. Odontexesis is the polishing of teeth by scraping, filing and planing. Instead of "prophylaxis," which has no special meaning except "to guard against," the term "mouth complexion" should be used, meaning the color scheme of the mouth. Any deviation from the color or contour as applied to the marginal gingiva spells trouble.

Odontexesis should be carried out at regular intervals, say three months, from the age of two years onward, or when the whole set of deciduous teeth is in place; and the mouth should be carefully examined by a competent dentist—one who is interested in and has time for children's dentistry. The operator or the dental hygienist will clean the teeth and give a toothbrush drill.

As the child develops, care should be taken that the teeth and gums receive sufficient cleaning and massage which, together with the right kinds of food, will exercise and aid in development of the maxillae—superior and inferior. In this way a healthy and normal growth of the second dentition in jaws large enough to maintain the teeth in physiologic alignment may be produced.

If supervision is complete between the third and tenth year, measures for assisting in the relief of cramped arches can be provided by such means as a simple method of widening by dental orthopedics, or perhaps more elaborate orthodontic appliances may have to be used for widening the arches, assisting in occlusal alignment, and preventing a condition of nasal stenosis or cramping.

The habit of an efficient mouth toilet after breakfast and before retiring should be impressed upon the patient at an early age, and never relaxed. In fact as soon as the patient is old enough to comprehend, the technic of tooth-brushing, with the brush best fitted to accomplish an individual mouth toilet, should be demonstrated fully, and the patient also should demonstrate at intervals his ability to carry out the methods shown. There is altogether too much slackness exhibited in this respect—too much is left to the imagination or taken for granted.

It cannot be insisted upon too forcibly that the proper cleansing of the oral cavity is absolutely essential for the mouth health of the citizens of the United States, whatever may be the case with Southern Italians, Maories, Eskimos, and various tribes of aborigines. These people apparently have the secret of providing the right diet for the prospective mother in the prenatal stage of existence, and as the infant is breast fed for a considerable period, there is every reason to expect the formation of strong, sturdy teeth and bones. Furthermore these teeth are imbedded in well-developed jaws with a much smaller percentage of malocclusion.

In the United States we find that children, probably because they are fed upon demineralized and ultrarefined foodstuff, do not develop strong teeth or adequate supporting tissues. All mothers should see that their children have the right diet and also the right cleansing of the oral cavity. No one factor will get results!

Among preventive measures may be included, as the permanent teeth begin to erupt, a consideration of pits and fissures and prophylactic odontotomy (Hyatt). Reference should be made to the extensive literature relative to this subject.

Dental orthopedics has been mentioned. Repair work should be carried out, but there is no need to discuss this aspect of the work here.

If it be found necessary to remove infected deciduous teeth, great care must be taken to preserve or maintain spaces left by such extractions.

As a further precaution a radiographic survey should be made periodically to make sure that developmental conditions are progressing in a satisfactory manner.

(2) At home. The mouth of a healthy infant may be left alone at first. When teeth begin to erupt, clean them with sterile gauze wrapped around the mother's or nurse's finger. At two years commence with a midget brush morning and night. Brush teeth from gum to occlusal surface up and down. Brush the occlusal surface up and down. Brush the occlusal areas, and brush the tongue.

From six to sixteen years have the child use a small brush with bristles separate and in well-divided rows. Use up-and-down method and include the gums. Clean the tongue by careful brushing or equally cautious scraping with a metal or whalebone tongue cleanser. Ribbon dental floss of suitable width can be used to clean and polish interproximally.

A toothpaste or toothpowder not too gritty is useful, or a solution of salt in water may be sufficient. For a mouth wash, salt water or lime water is good. The logical times for a mouth toilet are after a meal to be sure that no particles of foodstuffs, especially carbohydrates, are left to ferment, or in the case of animal foods, to decompose.

The most important duty of the dentist, from the odontexesis point of view, is to demonstrate in the patient's mouth the right method of brushing with the right kind of brush and to insist that the patient demonstrate his or her ability to follow suit. For it is certain that of all perfunctory measures undertaken in the name of health, toothbrushing is the most perfunctory.

To show the need for a careful checking up of every mouth from two years of age onward through life, a few passages from one of my previous articles are appended.

A large proportion of diseases common to human beings is concerned with the respiratory or digestive systems, and these two tracts are presided over by the mouth.*

Does it not seem only reasonable then that the mouth should be at least kept clean and wholesome; and yet what do we find in the average mouth presenting for treatment? Take, for example, the mouths of children or adults in the clinics of the Forsyth Infirmary, or the Harvard Dental School;

*Hyatt.

as a rule, such mouths are unfit for any kind of filling or artificial work until the deposits of tartar, fermenting and decomposing particles of foodstuffs, dead cells, and countless bacteria are removed. The results of such unclean conditions, viz., swollen, inflamed and bleeding gums, pus pockets and abscesses, must also be treated before much repair work is attempted. Such conditions in conjunction with decayed teeth spell all kinds of trouble, both systemic and local, for the individual. Food taken into such mouths is more or less poisoned from the start; and through inability of the decayed and broken down tooth machinery is directed into the stomach, not only poisoned, but also only half masticated, and therefore not in a condition to be digested properly; and that means that the individual will not be properly nourished. There is also the danger of this septic condition of the mouth causing an extension of the infected process along the channels leading to the larynx, bronchi and lungs in the respiratory system; or along the esophagus, stomach, intestines, liver, etc., of the digestive system.

In addition to the direct extension of the above mentioned poisonous elements there is also the danger of a systemic infection by means of the circulation of blood and lymphatics which carry germs from abscessed teeth and pus pockets. Hence are caused heart disease, joint disease, kidney disease, liver affections, eye troubles, and many other diseases—all from what is termed “focal infection.”*

We should not make a mistake of supposing, however, that all these diseases are invariably caused by diseased teeth and surrounding structures. Other possible centers must be carefully examined as well; in other words, a careful and discriminating diagnosis must be made in each case.

The average person is eager to know what can be done to prevent disease, and it is our duty to spread the knowledge of dental salvation, in the simplest possible way.

In line with the various hypotheses advanced as bases for this article, it is interesting to read an article⁴ entitled “The Responsibility of the Periodontist in the Social Aspect of Dentistry” by Dr. McCall, director of the Guggenheim Dental Clinic. This paper was part of the program of the Academy of Periodontology in 1933. The suggestion is made therein that inasmuch as the director of the Clinic has had two or three years’ experience with nine thousand children (January, 1933) he is enabled to give an opinion based on facts and in actual practice.

There is not scope for profuse quotation, but some of the statements made by Dr. McCall ought to be absorbed by every worker in the field of children’s dentistry, for example:

“The contribution of dentistry to the welfare of the general population is usually considered as lying chiefly in the realm of the prevention of caries. . . .”

The point here, of course, is that as usual we have been focussing from time immemorial on one factor, in this case, caries, or odontia. When we pull ourselves together sufficiently to be interested in supporting tissues or perio-

*It should be mentioned here, that the direct extension of septic processes from foci of infection to distant centers is questionable; that there are probably hitherto unsuspected chemical changes in blood and tissue to be demonstrated. And we all await with enthusiastic eagerness the publication of Broderick’s *New Dental Medicine*.

dontia as well, then we may fairly claim to have arrived at the starting post, lined up for a real dash into unknown fields of etiology and research, but unanimous in our resolve to be on the watch for all the signposts and guides of any kind whatsoever, however obscure, to help us in attaining our goal. Dr. McCall says: "Another conviction which has been developed as a result of my observations in the last two years is that caries and periodontal disease are more closely related as regards their underlying causes than is commonly supposed."

This is a very significant statement and somewhat in contradistinction with the usual view that caries and pyorrhea are the result of two entirely different diatheses—acidosis and alkalosis, and leads to the statement that the periodontist "must give more thought to the problem of general mouth health for the child than he has done in the past; and this must include consideration of the causes of both caries and periodontoclasia."

Dr. McCall thinks it imperative then that the Academy go back to first principles, viz., "oral prophylaxis." Dr. McCall advises "The establishment of full function with its effect on jaw development and its general hygienic influence on the oral tissues. From the standpoint of treatment, emphasis is placed on establishment of mouth cleanliness, the restoration of function, and the stimulation of the gingivae by massage, as having a 'remarkably beneficial effect.'"

I am in complete accord with this statement. Dr. McCall also says: "I am deeply interested in the problem of diet as a factor in the dental welfare of the child, but I realize that our knowledge in that field is still incomplete. Pending the time when we have this exact knowledge, and the still more remote time when we may, through educational efforts, bring about the widespread application of that knowledge, I wish to assure you that local care both by the dentist and at home can accomplish a surprising amount of good. . . ."

All this is very encouraging to our philosophy of dental health service as outlined in the introduction to this paper, and makes it all the more certain that definite improvements in the dental machine can be obtained through constant and combined efforts of the various branches of the healing art, teachers, social service workers, clubs, Boy Scouts, Girl Scouts, and others.

As demonstrating the practicability of this scheme, attention is called to an article⁵ by Dr. E. W. Morris, Battle Creek, Mich.: "Such a project involving all these cooperating agencies is being tried in three counties in S. W. Michigan, and the W. K. Kellogg Foundation is assisting the people of the three counties in developing a health education program on cooperative lines. These three counties have a population of 90,000. . . . This is a typical rural area with three towns, with populations of about 5,000 each. An analysis of the educational forces bearing on the health of children discloses the following: forty dentists, eighty physicians, three health officers, three sanitary engineers, three public health nurses, three rural school commissioners, fifteen school superintendents, 700 school-teachers, eighteen editors, forty preachers, sixty county councilmen, twelve character building leaders (Boy Scouts, Camp Fire Girls, etc.), three Rotary Clubs, three Kiwanis Clubs, six moving picture theaters, parents and other people, other children."

In each of the counties mentioned there is a county health unit, with a medical health officer, for: "Such a health unit is essential to a cooperative program of this type; for obviously we must have some agency that will co-ordinate all groups interested in the health of the community and act as the administrative agency for these groups. A well-organized health unit is the logical agency to take over this work." All of which is admirable in conception and furnishes ample proof that the mental impression which forms the basis for this article is eminently practicable and justifiable. For a successful issue, however, the program would not be too ambitious; and there must be complete cooperation among the groups concerned.

I wish to express my sincere appreciation of the help received from Dr. W. H. Card of Minneapolis, Dr. T. P. Hyatt of New York, Dr. F. A. Delabarre of Boston, and the late Dr. J. J. Sarrazin of New Orleans.

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YOUR PATIENT FROM SIXTEEN TO TWENTY-FIVE YEARS

In a consideration of "Your Patient," it should be understood that I propose to deal with this subject broadly, upon the lines laid down in the chart scheme entitled, "What Can Be Done for the Oral Machine."

In other words, it will be shown that the scheme of Diagnosis, Prognosis, and Treatment is applicable to each and every case; and that unless some such inclusive method is adopted in general practice the cause of dental health service will not be advanced.

Please remember that we must treat causes and not cases entirely; also that the dental office is a health center and not a repair shop.

One might add a slogan of Dr. Boyd Gardner's viz., "A clean tooth, well fed and exercised, cannot decay."¹

At the same time it is well to remember that we as a profession are still, after a hundred years of existence, very much in the dark as to the etiology of dental lesions, and realizing that fact, we should have no feeling of false pride in commencing all over again with a new ideal and the hope of attaining a new vision.

Before dealing with the patient of about sixteen to twenty-five years, I shall take the opportunity of introducing, by way of preface, a report handed in by a dental hygienist of several years' experience in a large public school system:

"My general impressions of children from the ages of six to twelve years with regard to dental health are based upon close observation during a period of five years as dental hygienist in a large public school system.

"During this period I have been dealing with the kindergarten through the sixth grade. My observations follow:

"1. Carious conditions seem to be more prevalent in the first grade children than in kindergarten children, due possibly to one or both of the following reasons:

"a. The great adjustment which the child has to make both physically and mentally during the first year of school, which causes a great strain upon his general constitution.

"b. Failure of the mother perhaps to give the child the same care with respect to diet, fresh air and rest now that he (or she) is no longer a baby.

"These observations lead to the conclusion that it is extremely important to see that the child's diet at the transition period is adequately supplied with bone building material to counteract any overdue strain caused by the adjustment to a new environment.

"Further suggestions are:

"(a) While a great deal has been done to save the six-year molars, more preventive work in clinics and in private practice, especially with reference to 'pits and fissures,' is urgently required.

"(b) More prevention in kindergarten and first three grades would tend to eliminate so many corrections in the upper grades.

"(c) There should be no let-up in the education of children from six to twelve on definite health habits and attitude by grades; and their interest should be stimulated by the correlation of dental health plans and experiments with their science and hygiene classes."

I have had the privilege of seeing the reports in detail, and I was much impressed by the almost invariable change for the worse in dental conditions during the first year in school as compared with kindergarten days. Herein is an important psychologic problem, it would seem.

Between sixteen and twenty-five years, from adolescence to maturity, there should be a wholesome mixed diet suitable to age, occupation, and environment.

In individual cases seek the advice of the physician, who will select the food supply, while the dentist keeps the port of entry in a hygienic condition.

The right kind of food is essential because during this period there is rapid growth, development of mind, with nervous and muscular activity.

Foods should provide:

1. Protein for growth
2. Iron for blood
3. Calcium and phosphorus for teeth and bone
4. Vitamins for growth and health
5. Iodine for health—in connection with endocrine function
6. Fats and carbohydrates for energy

To estimate the necessary quantities and qualities of foodstuffs for the individual, there should be an annual physical examination, and measures should be suggested to establish right principles of living in all respects.

THE DENTIST'S MANAGEMENT OF YOUNG CHILDREN

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THERE is one profession which has had a chronic need of assistance from child psychology, the profession of dentistry. The sciences of child psychology, of child psychiatry, and of child guidance have completely ignored this need. As a result, the average operating dentist, to quote one highly interested operator, has said emphatically, "Darn this kid business," and he either has refused to do children's work or has "passed the buck" at every available opportunity by procrastinating or by telling an untruth to parents about the need for such work. Fear and dislike of children's work, principally, coupled with low fees as a reward, have rather seriously crippled the profession's efforts toward the goal of preventive operative dentistry. If methods could be developed to manage child dental patients so that the average dentist's fear of trying to do work for them could be eliminated and so that he could insert fillings in their teeth rapidly enough to make a profit, much more preventive dentistry would be practiced.

The few pioneer children's dentists have had to manage their child patients on the basis of horse sense rather than on the principles of child psychology. But, one might say cursorily, study is one way for the general practitioner to increase his children's practice. But is it?

If the average practitioner were to take an extensive list of references on the psychology of children to his local library and were to start enthusiastically to obtain a reading knowledge of the psychology and management of children that he could transfer to his office, he would soon stop in disgust. The first obstacle would be the mass of material without criteria for its evaluation; the second would be its scientific terms, such as egocentricity, intelligence quotient, introversion, behavior pattern, negativism, and conditioned reflex; and the third would be the lack of anything relevant to his own problem of managing a juvenile patient so that an adequate filling can be inserted at a profit. Back would go his books; in would come a large lungful of fresh outside air; and forth would come a resolution to seek knowledge in other places than libraries.

In view of this more or less accurate statement of dentistry's situation today, it would be interesting at least to tabulate the various methods that children's dentists are advocating for the management of children in their offices. It would be still more interesting to attempt to evaluate these methods on the basis of generally accepted psychology principles of handling children. Is the juvenile dentist's "horse sense" child psychology?

Of the three usually accepted, primary, inherited emotions—fear, love, and anger—the emotion of fear, of course, is the one which the dentist must control during the child's appointment. The fear reaction is the thing uppermost in the dentist's mind, and he has three available factors for its control. First, the mental preparation of the child, his pre-appointment dental education, may

be either an immense assistance or an equally immense detriment to good management. Second, the dentist's office background, his physical equipment, his decorations, his furnishings, his assistant and her technics may give the child an anticipation of a happy experience or an expectation of a distasteful experience. Third, the personality and technics of the operator himself go a long way toward determining his control of the child's behavior, regardless of preconditioning or of office background.

Very frequently the dentist's new patient does not come to the office until he is in the first grade or still farther advanced in school. By that time "Jimmy, Jr." and "Virginia Jane" are quite a grown-up young man and woman of six, seven, or eight years, and they have a rather definite, disagreeable notion about a dental office. Children's dentists are lending their time to a vigorous campaign of parent education, whereby they hope to enlist parents in a movement to send their children to the dentist at the age of two and one-half or three years and to start them with the expectation of a new and pleasant experience, not with a dentist-ogre complex. Child-study-group talks, parent-teacher-group talks, radio talks, and lay magazine articles are all being utilized to bring a better-conditioned child patient into the office on his initial visit.

It would seem to be a mere matter of equity to plan part of the furnishings and decorations of a dental office for child patients if a part of the dentist's practice is devoted to children. Children as well as adults react to consideration and enjoy a sense of feeling at home. How far this children's theme is to be carried in decorations and furnishings is a debatable question among children's dentists. Is a play room needed? Are movies during dental operations worth the expenditure? Few operators are using movies, and most of those who are contributing to the literature do not think that a play room is indicated. After all, there is still the situation of a more or less painful extraction or distasteful cavity preparation to be faced in the operating room and to be handled by the dentist alone.

The third factor which I have listed in dental office management, the personality and the technics of the dentist himself, is the prime necessity for the control of the child patient. If we are to accept the verdict of certain contributors to pedodontia literature, we have to be born with the love of little children in our hearts and with a calm, patient, and sunny disposition which our small patients instinctively trust. A children's dentist, then, evolves by the sorting and pairing of his maternal and paternal chromosomes at the very dawn of his life.

Fortunately, this is not quite true. Some of us are introverts (the professional man most often is one), and some of us are extroverts; some of us inherit a hypofunctioning set of endocrine glands and some of us, a hyperfunctioning set; some of us have a thymicolymphatic type of constitution and some of us have an asthenic constitution; but our behavior can be built up largely by the habits we get through our interests and our environment. It has been said that we could make over our emotions in five to ten years if we seriously set out to do so. If one of these child-hating dentists were offered a \$50,000 annual salary to take a clinical position whose prerequisite was ability to handle chil-

dren, his interests and his environment would soon change his professional behavior patterns toward child patients. We all will not manage children alike, but we all can learn an adequate individual approach. Honesty, patience, kindness, sympathy, firmness, confidence, camaraderie, ability to diagnose the type of patient, cheerfulness, and so on are given as traits which we should have to practice dentistry for children. Let us acquire them as habits and not depend upon heredity to supply them as inherited traits.

Various classifications of children are to be found in the dental literature, and the operator, probably unconsciously, will be classifying his new child patient from the moment of introduction to him. Dentists will be noted giving their patients a mental classification on an intelligence basis, an instinctive basis, a psychopathic basis, a health basis, an ability-of-the-dentist-to-manage-them basis (for example, tractable or obstreperous children), and a behavior basis—the timid, the shy, the temperamental, and the incorrigible children. Each child type undoubtedly demands suitable technic on the part of the dentist.

A more productive classification of patients might be made on the basis of age or, still better, on the levels of social maturity. The child may be in the early childhood period, or age of egocentricity, that is, up to six or seven years. He is a rather asocial being of immense energy who does not react well to long confinement in a dental chair. He asks innumerable questions about equipment and operations and is bored to death by a detailed explanation. Any fantastic reply to his question suffices, and he may ask the same question again. He is usually a devout believer in authority and will do as he is told providing he thinks the Doctor is right.

In a short time the child patient has grown into the age of reciprocity or the Big Injun age, which lasts until eleven or twelve years. He is still in an age of great activity, an ever changing activity. This age level does not brook long dental appointments nor long periods of sitting with a widely opened mouth. He starts this period by believing with conviction that "What you do unto me, thus may I do unto you." A painful period of drilling is adequately offset by biting the dentist's finger. Cooperation gradually develops, and he winds up this period with a sense of his importance as a distinct individual in his social environment, one who is slighted by too juvenile treatment on the part of the dentist.

Eventually, this same patient slips into the awkward, adolescent age at eleven to thirteen years. He is now more sensitive to social conventions, and he has begun to get a real conception of the meaning of abstract terms. Dental prevention with its toothbrushing and regulations about diet is an understandable ideal.

This hasty sketch of the social maturation of the child should at least be an adequate explanation of why the three-year-old cannot be expected to respond like the eight-year-old and the eight-year-old, again, like the thirteen-year-old young adult.

For the purpose of aiding us to appreciate the social levels of very young children it might be well to recapitulate the levels of measurement of social

growth as they are outlined by Baldwin and Stecher.¹ First there exists the period of no attention, which lasts from birth to six months. This period, of course, is not at all pertinent to the dentist in his office.

The second stage in a child's social development consists in treating others as if they were merely objects. During this second stage the child has no realization that other children have the same properties and feelings as himself. He may push another out of his way, pull him down and stand on him to get a clock off the mantle, or he may hit him to see if crying results. This period begins as early as three months, and it may last as late as five years. The peak should come at two and one-half years, but an unsympathetic nature sometimes persists for life.

The third phase in the evolution of a child's social response is the phase in which he takes adult attitudes toward other children. An adult attitude may show a protective form—protecting younger children whether they need it or not. Protection usually takes the outlet of finding out what the younger child wants to do and then preventing him from doing it. This attitude may arrive at two years and may last until six years, unless it also should persist through life.

Then comes the fourth period of growth, which manifests itself by seeking attention. Doing things to get attention is a step further toward adult social maturity. The dentist can foster any of the things the young child does to focus attention on himself which will be of aid in his management in the chair; he can select the favorable activities for special attention and can disregard entirely the unuseful activities. This period begins at two and one-half years and lasts until five or six years, reaching its peak at three or three and one-half years.

Fifth, comes a still more socially mature response, that is, doing as others do. If one child of a play group sits down in the bird bath, all want to do the same thing. All the children of this social age should enjoy having their teeth polished by an aromatic paste if one of the group has enjoyed such an experience. The peak age for this response is three and one-half to four years, but it may begin at three and last until six, seven, eight, or nine years.

The stage of cooperation is eventually reached in a young child's climb to social maturity, but not before four or normally about five years. The child is now capable of sensible group activity. Each child in the group can now contribute his share in a project, and all working together at different activities attain a quicker and better result than each working alone. The dentist is wasting his time trying to get cooperation from his young patient until the child is capable of giving it.

If we dentists would occasionally use our afternoon off to climb a leafy tree and watch from this hide out a group of young children at play, we could learn much about normal child behavior. Perhaps we might learn that much of the child's behavior in our office is the normal reaction for his social age instead of the reincarnation of original sin. An atavistic excursion of this sort on our part might even aid us to insert better fillings.

I never did, I never did, I never did like
 "Now take care, dear!"
 I never did, I never did, I never did want
 "Hold my hand, dear!"
 I never did, I never did, I never did think much of
 "Not up there, dear!"
 It's no good saying it. They don't understand.*

To present properly the suggestions of various dental writers regarding the best management of a child in a dental office, one needs some scheme to classify these ideas. Faegre and Anderson² point out that a child's emotions arise when he meets a situation for which he has no inherited response. What are the stimuli that evoke fear? According to these two writers there are but three stimuli which bring out fear in a very young child: loud sounds produce a jerk of the body; loss of support results in random clutching; pain causes crying and holding the breath. All the rest of the fear reactions which a child acquires during the process of growing into adulthood are the built-up or conditioned reflexes so well described by Watson.³ An individual's fear of a loaded gun, a garter snake, presentation of an after-dinner speech, darkness, thunder and lightning, a traffic cop, a shop foreman, or a dental office are all conditioned responses. All of the fear responses in a dental office have to do with escape from pain or danger, and Gesell⁴ offers us two ways by which these fear situations may be controlled by dentists: (1) We may control the child from without by controlling the things toward which he is sensitive, that is, the dental office environment and its fear stimuli; (2) we may control the child from within at the period of his responses to these stimuli.

All the pain stimuli in a dental office are inflicted directly by the dentist himself. Since some of them are unavoidable, the child patient will have to be controlled at the period of his responses to these pain stimuli. He can be held forcibly during the dental operation so that he cannot move. Holding is one of the stimuli which elicit anger in the newborn; so this method of management is going to create a double dislike—a dislike of the bur running in his tooth plus a dislike of being held. This type of treatment produces a doubly negative reaction and is not fair to the child from an educational standpoint. If the dentist expects to do future work for the child, he should have enough self-interest in him to want to assume the rôle of educator and help him grow into a more socially acceptable response to a pain situation. The dentist can try to control with the child's cooperation, once his young patient has reached that level of social maturity. The dentist can rationalize an operative procedure: "It isn't nice, but it has to be done, so why fuss about it?" He can build up a sense of fortitude; he can make a plea to juvenile sense of fair play and square dealing; he can control by associating a pleasant experience with the painful experience; he can control his patient's sensitivity by seeking out the elements in a dental experience which cannot be endured and then helping the child to stand them. The possibilities of changing the young patient's responses to the practice of dentistry in his own mouth are numerous if the dentist tackles his problem of management with an interest in bettering his technic

*"Independence," from *When We Were Very Young* by A. A. Milne.

for the next situation instead of hating the child for creating a disturbance. Let us see what a number of dentists are doing in their offices to control dental fear stimuli and to control the responses of the child patient to these stimuli.

~ Practically every dentist who has attempted to write on the subject of child management has affirmed the value of explaining one's operations and instruments in understandable terms as one proceeds. This might be submitted as the greatest single aid to successful child management through control of the stimulus. Long detailed explanations are contraindicated for young children. The explanation may be a calming demonstration; it may be a bit of drollery that will appeal to the child's sense of humor. Carving a "J" on the operator's thumb-nail, carving a "J" on Junior's thumb-nail to show Dad at home and carving a "J" on Junior's tooth are many dentists' demonstrations of a dental bur. The dental chair works like an elevator, the buzzing bur may be a bumble-bee, the saliva ejector is an all-day sucker, and the spoon excavators are just a couple of spoons to clean the tin cans, old shoes, and newspapers out of Johnny Nerve's basement. Dr. Jordan⁵ has written a fable, "The Little Marble Houses," which will entertain the small child while an amalgam filling is being inserted and which will tell him all he needs to know about the anatomy of his teeth and the necessity for fillings.

Another direct control of the intensity of the stimulus, mentioned in nearly all papers by children's dentists, is the use of sharp needles, sharp burs, moist stones, good tastes, and nice odors. Utilizing such aids would seem to be obvious common-sense routine.

Practically all children's dentists agree that a painless operation should be performed on the first visit to the office. This may be a prophylaxis with a pleasant-tasting paste, a sedative treatment sealed into a cavity, or a filling in a small pit or fissure. Barring emergency alleviation of pain, a painless first appointment is the rule in most practices for children. This procedure not only reduces the intensity of the stimulus during the child's first appointment but also builds up a better conditioned patient for future appointments.

Dentists do considerable to control the stimulus to fear in the way they handle appointments. Promptness in keeping an appointment prevents a host of imaginary fears before the child even reaches the operating room. The length of the appointment definitely controls the duration of the stimulus to fear. A poll of the length of children's appointments given by various dentists indicates that these appointments range from fifteen minutes to forty-five minutes in different offices. The thirty-minute appointment is most often used. Besides giving short appointments, promptly kept, it seems to be a policy to make appointments for problem patients or for a difficult operation when both the patient and the dentist are fresh and rested. This practice makes for both a milder stimulus on the part of the dentist and a better adjusted response to it on the part of the small patient.

Pre-appointment missionary work is being done by some dentists by inviting the prospective patient to visit the office and by permitting him to observe a well-behaved patient in the chair during a dental operation. The negation to this practice is likewise practiced; prevent the new child from observing a poorly behaved patient in the chair.

While the dentist's control of the fear stimulus is being considered, the question arises, "Is force justifiable?" "Is the dentist warranted in admitting defeat, his inability to manage the patient, and in using physical force to manage him?" Dental office overhead runs along at the same price per hour whether the dentist inserts one pit filling in the tooth of a poorly adjusted child in a half hour or three pit fillings in the teeth of a well-adjusted child in a half hour. The very small child who cannot reason and cannot cooperate will have to be held forcibly if that is the only way he can be managed while the needed work is done. But the incorrigible child, how is he to be managed? He comes in with a bluff that has prevented other dentists from filling his teeth, with a chip on his shoulder, and with a "try-and-make-me-open-my-mouth" attitude. Quite a few dentists control this kind of child patient by putting a towel over his face and shutting off his supply of air (two or three times, if necessary) until he is willing to have his tooth repaired. This treatment seems justified. This type of behavior needs a jar, and this type of patient requires that his bluff be called or his chip knocked off his shoulder. His dentist is merely substituting a more disagreeable stimulus for the occasion. As this child learns that he must cooperate, a much better behavior pattern for the dental office is soon built. The fact that the incorrigible child, treated by the towel method, almost invariably becomes a good patient would apparently justify his first appointment treatment.

Quite an imposing list of methods to control the child patient during his period of response to dental office fear stimuli can be made from dental literature. The purpose of many of these methods is to enlist the child's cooperation by building up a fortitude toward dental operations. Many dentists attempt to rationalize the child's dental office fears in terms which the child can understand. The idea of building up fortitude toward a local injection by saying, "It is not nice; it has to be done to put the tooth to sleep; why fuss about it?" has already been cited. Other rationalizations might be, "I get hurt playing ball but I don't stop playing," or "If I cannot stand a small hurt in my tooth, what would I do in an automobile accident?" Questioning a fearful patient may elicit the elements in a tooth preparation which he cannot stand, and the dentist may be able to assist him to stand them. Using more hand instruments may help the child who cannot stand the buzzing of a revolving bur. If the child is afraid that the bur will suddenly drop into the pulp on an exposed nerve, telling him where the bur will hurt and where it won't hurt may help him to stand the cavity preparation with more fortitude. Some children object to the dentist's white coat because of a previous unpleasant experience with a white coat at a barber shop or a hospital. In such cases the dentist can discard his coat for a few appointments.

Most children's dentists agree that the subject of pain ought to be left until the proper time for the dentist to present it. There is enough pain in the world, anyhow, without anticipating it, and the child's mother is probably the worst person in the world to bring up this subject before her child in the dental office. If the dentist is allowed to handle all the pain discussion, however, he should be strictly honest and tell his young patient when an operation is going to hurt. There are points in cavity preparation that the dentist knows are going

to hurt; these portions of the tooth can usually be left until the last and the small patient advised. The patient who has built up a fortitude will hang on to the chair arms for a minute while the preparation is finished.

Getting relaxation in the child by using prearranged signals can be utilized to build up fortitude. If the tooth gets hot or if it hurts, the child raises his hand or his foot, or he says "O-ow!" The dentist must respect this signal and really stop when it is given, while the child must understand that it is not to be given without provocation.

A number of dentists strive to get their young patients into the habit of thinking pleasantly about the dental office. Very frequently a pleasant experience is combined with the unpleasant experience of going to the dentist. Some children get a prescription for an ice cream cone every time they go to the office; in other practices each child is given a souvenir—an empty bur box, a cotton roll, a drop of mercury, a piece of filling, a dull bur—before he leaves. These things are not given as rewards because they are given to the child every time he comes, regardless of whether he performs well or badly. Rewards as such are never educational, and they eventually outgrow their usefulness by developing a young but efficient blackmailer. The newspapers printed a picture in the "Side Glances" column in the past year of a young boy showing off his roomful of toys to a playmate. Said he, "But look at the things in this corner that I got for having my teeth straightened!" Some dentists merely recount how much work has been accomplished and compliment the child on the way he "can take it." Other dentists use correspondence to bolster up a good dental office feeling. From the birth date on children's records, a list is made and birthday cards are mailed; the child in the hospital gets a card of good wishes; and the child who refers a new patient gets a "thank-you" card.

Better management of the child patient and better control of his response to dental office stimuli are secured if the dentist recognizes that each young patient has his own personality and if he sincerely respects that personality. Thom⁶ puts it well: "A child leads a real mental life, full of hopes, ambitions, doubts, misgivings, joys, sorrows, strivings. These are being granted or thwarted much the same at three as at thirty." Quite a few methods can be listed by which the dentist consciously makes use of the child's desire for recognition.

Many dentists have their assistants learn each child patient's first name, or the name he habitually uses, over the telephone when the appointment is made. The child is met and greeted at the first contact by that name. His feeling of being important and acquainted is at once flattered. Unless he is accustomed to endearing or familiar greetings at home, such names as "Dear," "Honey," "Sonny," "Bud," and so forth destroy this fine feeling.

No matter how many parents or nurses or relatives accompany the child on his first visit to the dentist, the operator can more or less ignore them and ask questions about age, school grade, telephone number and so on directly of the patient. If the patient gets the idea he is a "Big Shot" in the office, that idea may carry over and make a "Big Shot" of him when a sore cavity is being prepared. Inasmuch as small children believe that grown-ups are ignorant, they might never have the urge to be grown-up at all if it were not one way of getting out from under adult domination. Since they do have this desire to appear

grown-up, any appeal to courage or any suggestion that such chair behavior indicates the beginning of a Red Cross nurse, an aviator, a traffic cop, or an army captain is at least worth trying.

Along the line of this same suggestion a bit of genuine flattery or appeal to the child's vanity can be utilized. Children appear to enjoy learning that they have nice teeth, that they are more robust than the average child, or that the dentist likes the clothes they are wearing.

Two dentists who have contributed to recent pedodontia literature advise the use of an operating stool for children's work. This seats the dentist beside the child, eyes at the same level as his, and makes for a friendly gesture toward him.

Most dentists deem it advisable with the majority of children to exclude the parent from the operating room after the first appointment. This policy appears to utilize the child's desire for recognition and to build up a better spirit of cooperation in him. In some homes the child has built up a habit of playing the gallery for sympathy; with an oversolicitous mother in the gallery, management of a painful situation gets to be a distinct problem. If the child is very young or unusually fearful, better management may be secured for a time by permitting the mother to sit in the operating room during the appointment but well in the child's background. With the incorrigible child the parent will certainly have to be excluded.

The ideal operating room atmosphere for the dentist and his child patient is one of mutual respect and good camaraderie. Overfamiliarity—playing with the child, teasing him—is a perverted friendliness. It reduces the operator below the plane of maturity of the child to the point of infantilism and very frequently results in an unmanageable child.

Both Gesell⁴ and Strang⁷ point out that the most successful treatment of a fearful child patient must be based on a respect for his fear. The mind of a fearful child may be diverted from the dental work by questions about his school, games, or playmates. Other things than dental work can be the subject for conversation: movies can be thrown on the ceiling, or an aquarium can be located beside him. Probably, after three years, the well-adjusted child does not care to be diverted by the dentist's attempt at fairy tales. The most important thing at the time is the filling going into his tooth. If he wiggles, give him a mirror. Dentists cannot expect to destroy immediately and entirely a deep-seated fear, but they can gradually moderate it. The good points in even poor behavior can be mentioned rather than a criticism. Suggestions can be made of the ways in which behavior could be improved. Cooperation and successful responses, on the one hand, deserve praise. On the other hand, fears cannot be laughed out by shame and derision; they cannot be frightened out by scolding or threats; and they cannot be cajoled out by false bribes or absurd rewards. The more respect the dentist pays his child patient as a distinct entity and personality, the more boasting the child will do about "my dentist."

In this paper I have raised the question, "Is child psychology employed by children's dentists?" I have attempted to evaluate the technics of a group of dentists who are operating on children. I have done it on the basis of dentist control of the fear stimulus and on the basis of dentist control of the child during the period of response to fear stimuli. Children's dentists are attempting

control of the stimulus through explanation, use of sharp burs, performing a painless first appointment operation, manipulation of appointments, permitting pre-appointment visits, and substituting more disagreeable stimuli for the incorrigible. They are controlling the child's responses to fear stimuli in two ways: first, by enlisting cooperation through a built-up fortitude, and second, by recognizing the child's personality. Fortitude is built up by rationalizing fears, leaving the subject of pain for the dentist, being honest about pain, securing relaxation, and developing pleasant thinking about the dental office. Addressing the child by his first name, appealing to his desire to appear grown-up, utilizing genuine flattery, using an operating stool, excluding the parent, developing an office atmosphere of mutual respect and camaraderie, and showing respect for the child's fears are all aids in utilizing recognition of a child's personality. On this basis one might reasonably conclude that the children's dentists who are contributing to the dental literature are consciously or unconsciously invoking child psychology while practicing "horse sense" on their child patients.

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Healthy Babies Are Happy Babies. By Josephine Hemenway Kenyon, M.D., 1934, Boston, Little, Brown, and Company.

In his search for the etiology of malocclusions, the orthodontist has more and more often to go back to the patient's earliest periods of life, when behavior patterns are set and habits are started. For this reason, he must be familiar with the normal and abnormal conditions of babyhood. An opportunity to become well acquainted with the baby's life is offered by Dr. Kenyon in this book, which is rather unusual in the way that it deals with the healthy child rather than with the sick child. The author describes the normal baby, its growth, actions, and reactions. Only after the picture of the healthy baby is well-rounded and conceived, do we hear about the changes that mark the road to disease.

THE NORMAL BABY

The baby's life is divided into certain periods. We see him when he is born, when he is two weeks old, when he is two months old, and ever so often, up to the time when he is three. Each time we see him, we inquire into his health, and we receive as an answer a description of all the normal manifestations of his life at that particular period. We hear about his rate of growth, his motor achievements, his fatigue and his rest, his acceptance of conventional behavior, his table manners, his toilet habits, his speech and vocabulary, his posture while lying, sitting, standing and walking, his play and exercise, his sleeping habits, his emotional changes, and his mental accomplishments.

ABNORMAL TENDENCIES

Periodic health examinations, conducted by the physician at regular intervals, reveal deviations from the normal development. They provide opportunities for early corrections of conditions like constipation (exercises), over- and under-weight (dietary regulations), poor postures (corrective play), mouth-breathing (removal of cause), abnormal habits like thumb-sucking, and bad temper (self control and discipline).

DENTAL PROBLEMS

The dental problems start when the baby is four months old. At that age the baby begins to drool, as he has not yet learned to swallow his saliva. This drooling period should last only a short time, but is prolonged when nasal

breathing, with the lips closed, is difficult. (Possibly, we have to go back to this drooling period for the earliest beginnings of mouth-breathing.) If the mouth is continually kept open and the tongue protruding outside the mouth, myxedema may be the reason for it. The mouth continually kept open and the protruding tongue should be treated as early as possible (there we may find an etiologic factor for certain protrusions of the mandibular teeth).

Tooth cleaning should be instituted as soon as the teeth have come through the gums, by means of a cotton swab on a toothpick. This starts the tooth cleaning habit. Delayed tooth eruption, if not an inherited factor, indicates the possibility of improper calcification, due to calcium unbalance and thyroid dysfunction. This may also be the cause of poorly calcified bone, a condition which needs immediate attention because muscle pull may bend the soft bone structure.

Teething should not be regarded by mothers as something to be looked forward to with apprehension. Teeth erupt, as a rule, through the gums with little discomfort to the child; the belief that teething causes fever, irritability, restless sleep, and stomach upsets has no foundation.

HABITS

Sleeping and posture habits must be watched most carefully. Systematic exercises to overcome bad habits are recommended just as soon as they are noticed. It is always easier to prevent a habit than to correct it. The correction of a habit should be undertaken along psychologic lines. For instance, when the baby first puts the thumb into his mouth, take it out gently and prevent him from doing it again. Remove his finger again and again as if it were a casual matter. Place a toy in his hand, give him something constructive to do; punishment or saying "no" simply calls the child's attention to the bad habit and arouses opposition.

Baby's first visit to the dentist should be made when he is two years old. This will allow for his proper examination and also have the child become accustomed to dental visits.

The division of the text into chapters which correspond to definite age periods is a convenient arrangement. It also helps to visualize that growth, while it is continuous, can be realized only in intervals. The careful reference to all dental conditions is most gratifying in view of the fact that the average medical publication on this subject rather seems to neglect the teeth. An attempt has been made to avoid Latin or Greek medical terms, though the author may easily go further in this respect. The use of technical terms in books intended for the lay public should be dispensed with as much as possible. For instance, the counting of the embryo's age by lunar months may be scientific, but is confusing to the average person.

Print, binding and set-up of the book are very satisfactory. A chapter on emergencies, an appendix classifying foods, a comprehensive index, and several charts are added features. Dr. Kenyon proves in this book not only that she understands the baby thoroughly, but also that she can make the reader understand him. The little fellow, whose picture appears on the cover, takes on a very definite shape as we watch him grow and develop throughout

the pages. His life's breath comes from the engaging and sympathetic manner in which his story is told, and which will go a long way to make him popular.

E. N.

Practical Pedodontia or Juvenile Operative Dentistry and Public Health Dentistry. An introductory text for students and practitioners of dentistry by Floyd Eddy Hogeboom, D.D.S. Third Edition, 1933, St. Louis, The C. V. Mosby Company.

"Prevention as applied to dentistry means a minimizing of those adverse conditions of life which tend to shorten the period of dental efficiency." With this definition, the author sets himself a big task and one he cannot

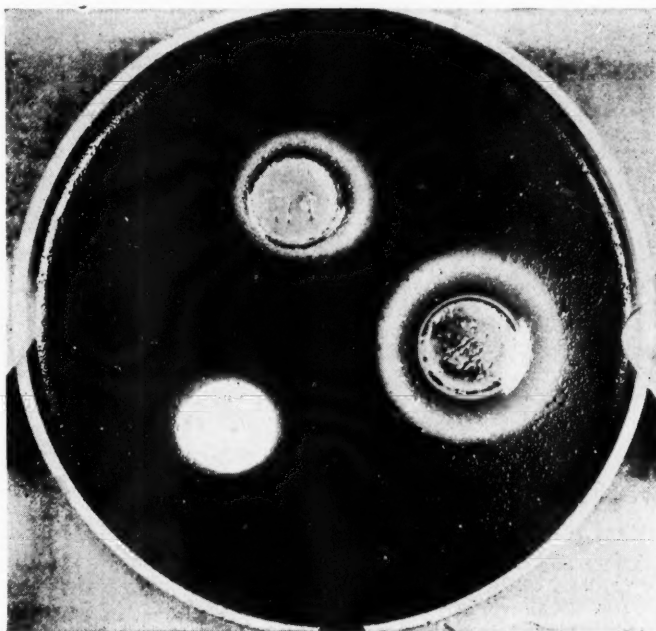


Fig. 1.—Bacteriologic test of filling materials. Uniform discs placed in a culture show largest area inhibiting bacterial growth around copper amalgam, then silver amalgam, and last silver.

truly fulfill without including children's orthodontia in his book. For this reason he uses a subtitle limiting his scope to juvenile operative dentistry. Within that limit he covers the subject so thoroughly that his book, instead of needing the orthodontist's cooperation, demands his attention.

After the management of the young patient in the dental office is discussed, a very appropriate scientific contribution is made by Dr. F. N. Anderson on the mental hygiene of the child. While the behavior of every person is motivated mostly by emotions, this holds specially true for the child. An adult is open to argument, a child is not. Therefore, the child should not be persuaded to do a certain thing, but he should be told why it will be worth while for him to do so.

An extensive study of embryologic and developmental factors leads up to the chapter on cavity preparation in which Black's classification and pro-

cedure are followed. From among the various filling materials, copper amalgam is preferred for its great strength and good adaptation to the cavity walls. Bacteriologic experiments also show that copper amalgam prevents the growth of bacteria in a larger area than does silver amalgam, silver, or gold. (Fig. 1.) For more extensive cavities, the gold inlays or the less expensive aeolite inlays are recommended.

The great importance of the first permanent molars makes prophylactic fillings advisable. The theory and practice of prophylactic odontotomy are described by Dr. Thaddeus P. Hyatt in a special chapter. If decay has reached the pulp, treatment and filling of the root canal are undertaken for deciduous as well as for permanent teeth.

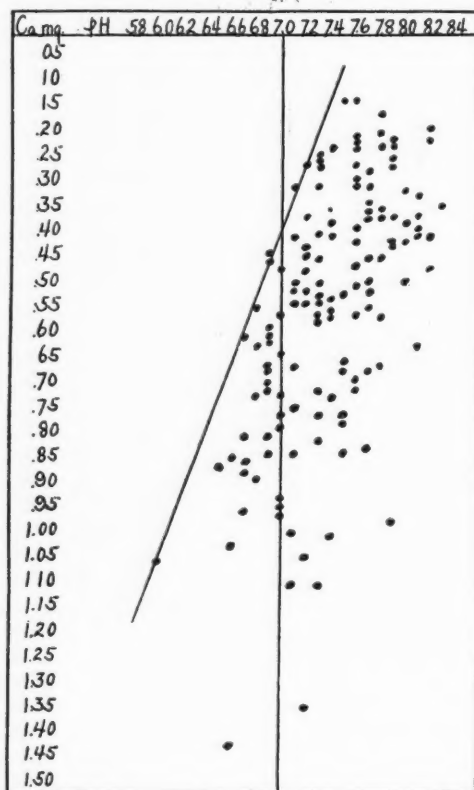


Fig. 2.—Immunity to decay is present when saliva is alkaline (right of vertical line) or acid with high calcium value (right of diagonal line).

The biochemical aspects of preventive dentistry demonstrate the relationship between caries and nutrition. Their practical application is the prevention of dental caries by nutrition, which Dr. Harold F. Hawkins takes up in a separate section. The basis of his findings is the alkalinity of the saliva, which should be strong enough to neutralize the acids due to the fermentation of food particles (Fig. 2).

The use of space retainers is recommended in all cases where deciduous teeth are lost one year or more before their normal time of shedding. (This time limit is perhaps too liberal, as a good deal of drifting of adjoining teeth may occur in one year.) Dr. Harry E. Straub contributes a chapter on anes-

thetia, comparing the relative merits of local and general anesthetics. Among the latter, ethyl chloride and nitrous oxide with oxygen are considered as valuable for extractions in children.

The relationship of endocrinology to dentistry reveals many interesting facts, of which most typical are: lack of thyroid function, which retards tooth development; lack of pituitary secretion, which retards body and jaw growth; and an oversupply of pituitary secretion, which produces overgrowth and premature tooth eruption. Examples for these and other types of endocrine disturbances are given and described with the aid of instructive illustrations. These include roentgenograms of the patients' hands as an accurate method to determine general body growth. In this manner the x-ray examination is used not only for detecting cavities in the children's mouths but also for studying their "bone-age" development. (This study reminds the reviewer of Dr. Clinton C. Howard's splendid work on the same subject.) The office prophylaxis should be utilized to accustom the child to the dental office.

A chapter on public health and dentistry is added for the benefit of those dentists or dental students who contemplate entering public health service.

This brief description of the book's contents shows that the subject of juvenile operative dentistry has been unusually well rounded out. From a total of 328 pages, only 45 deal with actual operative procedures. It is the careful consideration of all correlated sciences which constitutes the most outstanding feature of the book, and the one which will make it most valuable to the dental student and the orthodontist interested in preventive work. However, noticing the due consideration to the fundamental sciences, it may well be suggested that dental anatomy be treated in greater detail, and that descriptive material be added to the anatomic charts. This would form a suitable conclusion to the very fine chapters on embryology and development of the teeth. Again, a brief discussion of the histologic structure of the tooth would enhance the value of the carefully prepared sections on cavity preparation, prophylactic odontotomy, and prevention of dental caries.

The well-arranged and fluently written text, together with the splendid illustrations (of which the good reproductions of roentgenograms deserve special mention), the substantial paper, and handsome binding make it a pleasure to read and to own this book.

E. N.

The Forum

Articles for this department should be sent to Dr. Albert H. Ketcham and Dr. William R. Humphrey, 1232 Republic Bldg., Denver, Colo.

More About Fees and Forms

A word of commendation seems appropriate relative to the introduction of the Forum in the Journal, and now that we have it, its usefulness and popularity will be in direct proportion to our readiness to offer comments.

The discussion of Dr. Flesher's article "Counting the Cost" in the September issue of the Journal should prove helpful to one desiring to adjust his practice to the changing conditions confronting us today.

There was a time when counting the cost was not so necessary because orthodontists were few and far between; they were engaged in a new field, and usually were located in the metropolitan centers.

Nowadays many people who formerly would not have questioned any fee find themselves in reduced circumstances, and cannot spend with the same freedom as formerly. There is also an ever-increasing recognition of the importance of orthodontic treatment as a health measure. It has passed from the class of a luxury and is being rated as a necessity.

He is heartless indeed who finds a child of wage-earning and small salaried parents in his consultation room and is not willing to go far to make his services available to them.

There are communities in which the supply of orthodontists, both adequately trained and otherwise, had outrun the demand for services. An increasingly large number of general practitioners with painfully reduced incomes are being tempted by patients whose incomes have also dwindled, to undertake orthodontia treatment for fees that are arrived at by guess, and are often ridiculously low. In many places, if reports are true, cooperation among orthodontists has degenerated into competition of the worst kind.

For these and many other reasons, it has become imperative that we give more attention to the business aspect of practice. We must determine what it really costs to treat our cases, and be on a constant lookout for ways and means to provide service within reach of all who are in need of it. One of the most promising possibilities in this direction lies in the adoption of the stainless steel wires for working parts of appliances. Not because it is a cheaper material, but because of its gentler and more lasting spring, which makes it possible to see our patients less frequently, and thus serve a larger number.

No one thing contributes more to pleasant relations between ourselves and our patients than to have a definite understanding at the beginning of

treatment; what corrective measures are indicated, what may reasonably be expected to result from them, and what we expect from the patient (and parent) both as to cooperation and as to emolument.

It seems obvious that different conditions require variant financial arrangements; just as they may require different treatment. What will work beautifully in one case may be impractical for another. There are some cases in which a fixed fee may be the best arrangement, while in others some form of contingent fee will be more satisfactory.

The forms used by Dr. Ketcham and Dr. Humphrey, as shown in their article in the December issue appear to be very good indeed, especially the appointment card with the instruction on the back. This may be varied so that many useful messages may be included.

EXHIBIT A

LANDIS H. WIRT, D.D.S.

ORTHODONTIST

1002 BUILDING AND LOAN TOWER
SOUTH BEND, INDIANA

To

I have examined

and find that the teeth are

in malocclusion, as described below:

While there are many unforeseeable factors that may modify the response to the treatment, it seems probable that the necessary correction can be accomplished in approximately

The fee for my services including construction of all necessary appliances while in my care for treatment of this case will be: payable as follows: when instructions to begin are given, and

As orthodontic treatment is continuous while appliances are being worn, and the charges are not contingent on visits to the office, there will be no omission of payments as specified, except in case of prolonged illness of the patient or myself.

Arrangements will be made by me where possible, for such attention as may be required during vacation periods.

Should it become necessary for the patient to be permanently transferred to another Orthodontist on account of change of residence before completion of the treatment, the payment as above up to date of leaving will be considered as in full to date, and reference will be given to an Orthodontist in the place to which the patient is going, if there be any.

I am not entirely in favor of an arrangement calling for payment by the year. Frequently in the case of the younger patients, one may come to a waiting period in a few months, and waiting periods are not governed so much by time as by development, or phases of correction accomplished. I realize that cases started early may not be dismissed under several years, but it frequently occurs that the time during which they are under active treatment is less than that of the rest periods. In fact, in all cases in my practice in which the use of the newer types of appliances with stainless steel as the persuasive element (not force) has been adopted, the response has been so much more rapid that working periods become shorter and rest periods longer than ever before. I am thus finding more cases in which the fixed fee is more

satisfactory. Where formerly I estimated the time to be required for correction to be "so long or longer," I now more often say it will require "so long or less."

Occasionally a case presents in which there appears to be reason to suspect obscure factors which may prolong the period indefinitely, as where deciduous teeth have been lost early and abnormal gum tissues and bone have interfered

EXHIBIT A (REVERSE SIDE)

ORTHODONTIC TREATMENT

The principal functions of the teeth in the human being, are the mastication of the food, the clear enunciation of the words in speech, and to serve as a part of the substructure upon which the features of the face are formed.

Any deviation from normal position or interrelation of any of them impairs their usefulness for any of these functions, and also makes it more difficult to preserve them in a healthy condition or to repair them successfully when they have been attacked by dental disease.

These conditions usually have associated with them abnormal or insufficient development of the bony structures underlying the face, and the nose and throat are often involved leading later to defective hearing, throat affections, sinus infections, and many other physical and even mental disturbances.

The inharmony of position or interrelation referred to above is called *malocclusion*. It is corrected principally by means of appliances made of gold and platinum bands and wires, so designed and applied as to stimulate growth of the bone about the teeth, and direct this growth in such a manner as to bring about a return to harmony of function and appearance.

Since the disfigurement of the features and the lowered masticating efficiency are both serious handicaps to happiness, health and success all through life, their correction by orthodontic treatment may mean a great deal to every child or youth fortunate enough to secure it.

The success of the treatment may depend very much in some cases on the interest and cooperation manifested by both the patient and the parent.

Appointments are set with regard to the definite adjustment of the appliances to carry on and should be kept promptly. Otherwise, the movement of some tooth or teeth may be carried too far, or otherwise give rise to trouble; for when an appointment is broken it is not always possible to make another without serious delay as the time is usually taken several weeks in advance.

Instructions with regard to keeping the teeth and appliances clean and free from injury, and for periodic visits to the family dentist are followed better when the *parent* accepts the responsibility.

When, as occasionally happens, it is found that proper cooperation simply cannot be obtained, the only thing to do is to dismiss the patient to make room for another who may appreciate our efforts enough to work with us.

It is scarcely to be expected that an orthodontist can accomplish perfect results in every case, even with the best of cooperation, nor that every case will remain permanently in perfect condition; but he can and will undertake to give his very best skill and service.

with prompt eruption of the succeeding teeth, or where endocrine disturbances are suspected. In these the arrangement is made setting the fee for certain treatment, and if further attention is later found necessary, its cost will be decided at that time.

A form of memorandum (Exhibit A) which I have found very satisfactory provides for considerable latitude in describing what correction is needed,

how we plan to accomplish it, and any of various financial arrangements that we may wish to use. A message on the reverse side is intended to convey a concise but comprehensive idea of what it is all about.

I like the form (Exhibit B) which is used as a notice rather than as a statement or bill, and it can be used whether payments are expected annually, quarterly, or otherwise.

EXHIBIT B

LANDIS H. WIRT, D.D.S.

ORTHODONTIST

1002 BUILDING AND LOAN TOWER

SOUTH BEND, INDIANA

This is to advise you that \$----- will be due and payable
on the----- of----- for professional services
for-----

Received payment-----

Unless requested, no receipt will be returned when payment is made by check.

The appointment card (Exhibit C) is a convenient one, and on its back one may place an appropriate message. The one shown is designed to help patients in securing leave of absence from school.

EXHIBIT C

YOUR NEXT APPOINTMENT IS		
Day of Week	Month	Date

At-----O'clock

DR. L. H. WIRT, Orthodontist.

EXHIBIT C (REVERSE SIDE)

The attention of parents and teachers is invited to the fact that as orthodontic treatment is almost wholly limited to children of school age, the orthodontist cannot attend all his patients out of school hours; that as correction of malocclusion of the teeth and mal-development of the jaws is of extreme importance and may favorably affect the whole future of the child, it is worth while even though an occasional absence from school is necessary.

Probably other orthodontists have various forms which they have found useful, which might prove helpful to readers of the Forum if sent in.

Landis H. Wirt.

Orthodontic Education

Dr. H. C. Pollock, Editor,
International Journal of Orthodontia.

November 21, 1934.

My dear Doctor Pollock:

It is indeed a coincidence at this time when here in New York we are celebrating the centennial of the organization of the first dental society that the discussion regarding the relative merits of the proprietary postgraduate schools in orthodontia should come to the fore again. There is much to be gained in reviewing the history and evolution of dental education in America during the past century that should serve as a guide at this time in solving the relative merits of proprietary schools versus universities, of long courses versus short courses, of proper supervision of postgraduate education versus no supervision. Is it not true that progress can be made only by gaining from the experience of others?

The relative importance of the specialty of orthodontia has grown in the past thirty years. It has been an outgrowth of the practice of dentistry, very much the same as dentistry has gradually evolved as a specialty of medicine. There are some men fighting against a proper training in orthodontia just as there were men who fought against the lengthening of the dental courses during the past century, those who are fighting for the proprietary school just the same as there were some who fought for the proprietary dental schools, and it is indeed strange that the advocates of the proprietary schools both then and now should be the owners of proprietary schools.

We would not justify the old-time dental colleges "at the time when the dental college course consisted of two terms of six or seven months, with a vacation period between," when "little or no preliminary education was demanded, and a man was permitted to practice dentistry with no other license beyond his college diploma"* by pointing to some of the great pioneers who graduated from them. The attempt to justify the meager training they had by the results achieved would seem absurd. Is it not strange therefore that the meager training of the pioneers in orthodontia should be held forth as a justification of short courses by proprietary schools at a time when these pioneers themselves tell us that that type of education is antiquated?

Dr. Henry W. Gillett makes some statements that are particularly appropriate at this time, the more so because he is one of the great pioneers of dentistry and has taken an active part in contributing to its advancement from its small beginnings even up to the present time. He says, "From 1885 to 1915 or thereabouts, improvement in dental educational plans was slow and hesitating. The demand for it became emphatic enough by the latter date to cause the proprietors of the private schools some perturbation."

"With the amalgamation of the three national associations actively interested in dental education, and the inception of the Survey of Dental Education by the Carnegie Foundation for the Advancement of Teaching in 1922,

*Ottolengui: Editorial, Dental Items of Interest, November, 1934.

the privately owned schools began to disappear. Some of them ceased to exist and others formed satisfactory connections with universities or medical schools. Some of these privately owned schools are believed to have been very profitable for their stockholders. Classes were often much too large for the physical facilities and equipment, and teaching expenses were kept at a minimum." With special reference to orthodontia he says, "I tried my hand and for a long time sided with that group of the profession that held to the concept that orthodontia belonged in the hands of the general practitioner.

"The astonishing development of orthodontic science by the specialists under E. H. Angle's leadership, finally convinced me that the general practitioner should confine his work in this field to early recognition of the need for orthodontia, the application of early preventive measures and to the simple cases."*

Dr. Ottolengui, another pioneer who made dental history not because of but in spite of his meager early training says, "Just as it became manifest that it was not safe to trust a dental graduate or a medical graduate to practice upon human beings, it is rapidly becoming evident that specialization in medicine and dentistry must soon be restricted. The writer prophesies that the day is not far distant when postgraduate courses, and later on well-established postgraduate schools, will come into being and that before a man can 'hold himself out' as a specialist in any branch of dentistry, or medicine, it will be necessary for him to take a course of this character and to obtain a license from a competent board of examiners."†

These are the views of aged and learned pioneers in the field of dentistry. Opposed to them are the views of graduates of a recently organized proprietary postgraduate school for the teaching of orthodontia. Shall we heed the warnings of these great men who have no other ulterior motive than the welfare of the public at heart, or shall we by trial and error make the same mistakes they did only to come to the same conclusion a little later?

In your editorial in the November issue, you refer to the fact that medical men are not compelled to take their postgraduate courses in specified institutions. The situation is not entirely analogous to the situation that presents itself with regard to the practice of orthodontia. It is true that a medical man who has passed the examinations given by the state medical board is legally permitted to practice any of the specialties of medicine, just as the dental man who has satisfied the state licensing requirements may practice orthodontia. However, there are two important points that should be borne in mind with regard to these facts. First, as Dr. Ottolengui has emphasized, medicine, too, feels the need for the licensing of specialists. Second, in medicine there is a check which operates to a great extent in restraining men not properly qualified from entering most of the specialties. Whereas in the practice of dentistry all our work is done in our private offices with absolutely no supervision, in medicine it is a necessity that the physician maintain a hospital connection because much of his work in the majority of the specialties demands the hospitalization of his patients. When a patient is admitted to

*Gillett: Progress in Dentistry 1882-1934, Dental Items of Interest, November, 1934.

†Ottolengui: Editorial, Dental Items of Interest, November, 1934.

a hospital, even though the physician who referred the case in is still attending the patient, the chief of the department to which he is admitted is automatically placed in charge and is thereafter responsible for the welfare of the patient. Thus in the evolution of the practice of medicine restraining influences that tend to protect the public have evolved. Nevertheless, even in spite of these checks, in medicine as well as in dentistry, the trend toward the licensing of specialists is noted, and there has been much in the medical literature advocating it.

The statement that "approximately 86 per cent of the orthodontists of America have received their training from independent and private sources" is true. Not so long ago all medical and dental men received their training from private sources, but the private sources have outgrown their usefulness in medicine, in dentistry, and in orthodontia. The universities have replaced them. You state that "up to the present time they have offered little if any solution for the man in general practice who desires to include orthodontia in his everyday work."* This is not a fact. We at New York University give a postgraduate course extending over four years, during which time the student spends three mornings a week at the college. This enables him to maintain his practice while studying. Some institutions have made similar arrangements extending over a two-year period, and some have a one-year course devoting full time to the study. The universities are doing all they can to extend teaching facilities so that men may become qualified to practice orthodontia. The reason universities do not give short courses in orthodontia is exactly the same reason that the medical schools and dental schools have lengthened their courses, namely, the subject cannot be properly taught in short courses.

Orthodontists have not made a "mystery" of their specialty as is charged in a recent article from which you quote. As evidence of this fact your publication, *THE INTERNATIONAL JOURNAL OF ORTHODONTIA*, has been in existence since 1915 and is filled with information which any one who wishes may read and study. The pioneers in orthodontia have given freely of their knowledge and experience. The mystery exists only for those who would receive their information in "pill form." The subject matter of orthodontia does not lend itself to that form of teaching. Let any one who feels that "orthodontists as a group have made less concerted effort to bring their increased knowledge to the dental field than has any other group of specialists" attempt to read the literature published on the subject for the past fifteen years and compare its extent, its scientific value with the literature in any specialty of medicine or dentistry, and he will soon change his opinion. The trouble with most people is that they are attempting to find a short-cut in the acquiring of knowledge. Unfortunately, knowledge comes from perspiration and not from inspiration.

With reference to the statement "that the art and the science of orthodontia have not been standardized, that there are different technics with their different sponsors, each claiming infallibility,"* let me remind the author of

*Pollock, H. C.: Editorial, *INTERNAT. J. ORTH.*, November, 1934.

it that in the fields of both medicine and dentistry standardization has not yet come. There are advocates of fixed bridgework and of removable bridge-work; some men still prefer plugging gold foil to the use of inlays or of amalgam fillings; in medicine, these are homeopaths and allopaths, the internist and the surgeon still argue over the relative merits of medicine versus surgery in the treatment of some conditions, but you would not suggest that because of this lack of unanimity the courses should not be given by universities. Progress is made because of these differences of opinion. These different technics all have the same objective, and it becomes the more important to give the student a thorough fundamental training so that he might be the more able to evaluate the benefits of the one school of thought over the others. Unfortunately, the uninitiated is readily confused. "Technic is not dentistry nor orthodontia. Mechanics is but a means. The end attained is the measure of success, and this success is measured by the degree of normal function restored. Thus, an appreciation of certain fundamental concepts of the nature of the masticatory apparatus must direct and control all operations if the greatest service is to be rendered."†

However, I do feel that if the orthodontic societies made a greater effort to get the general practitioner to attend some of their scientific meetings, much good could be accomplished. Similarly, I feel that more orthodontia should be taught in the undergraduate school. When the students or general practitioners are not taught orthodontia, or get very little of it, the tendency is for them to think that we are withholding information. It would be far better to acquaint them with our problems. It is much better to keep them from practicing without proper training not by withholding information and creating fear, but rather by acquainting them with the difficulties of our problems with the result that they will refrain from practicing a specialty for which they are not prepared.

Sincerely yours,

Samuel Hemley,

Associate Professor in charge of Orthodontia Department.
New York University College of Dentistry.

*LeBlanc: Dental Cosmos, page 1053, 1934.

†Weinberger: Evolution of Orthodontia, J.A.D.A., p. 2009.

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Editorials

Gnathostatic Diagnosis in Cross-Section After Ten Years

AT THE meeting of the New York Society of Orthodontists, November 12 and 13, 1934, at the Waldorf-Astoria Hotel in New York, Dr. Allen A. Suggett read an interesting and comprehensive paper on "Gnathostatic Diagnosis of Malocclusion."

It may be recalled that Professor Paul Simon of Germany introduced this subject in America approximately ten years ago. At that time some orthodontists believed that the introduction of Simon's theory of the law of the canines as a new step in diagnosis was the first important modification to Angle's widely accepted classification of malocclusion. Throughout the intervening years this subject has been discussed both formally and informally; it has stimulated thought, writing, and research in the entire field of craniometry.

Although introduced some years ago by Simon and translated into English by Lischer, gnathostatics is still in the controversial stage, as evidenced by the interesting discussion which followed the reading of Dr. Suggett's paper recently in New York. A group of loyal, front-line stalwarts, who have heroically championed the cause of the canine for some years, were quick to regiment themselves in defense of the theory and fervently advanced an appeal for the "scientific approach" which, it is claimed, is part of the gnathostatic program as contrasted to the arraigned inadequate methods which have been followed for years and which are challenged largely as being based upon the alleged fallacy of Angle's theory of the constancy of the permanent maxillary first molar. Those who defend the Simon theory contend that from the standpoint of diagnosis the organs of mastication should be correlated with the several planes of the skull, much as the latter have been used as the basis for measuring and surveying in the science of anthropology.

It is contended that gnathostatics is based on a so-called ideal that does not exist, but that it can be used as a starting point for orthodontic diagnosis, or a working fiction, so to speak; further, that a perfectly normal denture does not exist but that it may be comprehended. Therefore the theory is based on a fictional normal, and even so it is realized that the problem is of a biologic nature.

The casual but interested observer cannot doubt the enthusiasm of those who advocate the Simon theory; however, those who believe that the theory (it being a fiction) is perhaps overemphasized by its zealous upholders as to its significance in orthodontia are skeptical of the proposed importance of the entire gesture.

Those who view the orthodontic problem as one of hereditary active growth, entirely of a biologic or genetic nature, are equally as vehement in their arguments and contentions. They claim that yardstick devices and perspectives are of little more actual use to an orthodontist than are tape measures to a portrait painter. Their contentions are based largely on the proposition that after all it is not important where the line of the orbitalia drops, whether it be east or west, up or down, in relation to the canine eminence, because growth and genetic structure of each individual are peculiar to each and are subject to wide variation, and furthermore that the character of the chromosomes in the fertilized egg determine for the most part what the individual's normal is to be. They point out the fallacy in attempting to direct calculated or statistical averages to the problem of growth, which is variable in its progress and changes in the form of structural elements. They assert that any rule of calculation or method of regulation is out of keeping with the character of the problem, which is life processes and therefore a genetic not a synthetic proposition.

To illustrate further the concept of the opposition, it has been said quite informally that the curve, shape, and general structure of a puppy's tail depend more on whether he was conceived in the careless and casual neighborhood melting pot or in some carefully governed kennel, where genealogy and mating are definitely known, than upon any other one thing. The pup might have a tail that took on the general design of a corkscrew or one that ex-

hibited the long, parabolic curve of a large palm-leaf fan. Whichever he might be endowed with, it would be useless to work out an average norm by which to guide the shaping of any particular tail because each dog is created a unit unto himself, and the individual curve of his tail was decided long ago largely by the genetic structure of the strongest male dog in the assemblage, which no doubt became his father. If the resultant offspring's tail became deformed for some obscure etiologic reason, it would be of little purpose to measure the degree of deformity by lines and angles and try to ascertain an average normal between corkscrew tails and parabolic tails and then to correct the tail according to this fixed expectancy, because each individual is a variation unto itself and the result would probably be synthetic and a man-designed incongruity. A better way, but one which perhaps would not be entirely scientific, would be to adjust the tail much as a surgeon performs an operation, the procedure to be decided and based on the opinion and experience from successes as offset by those from failures of men who had corrected or repaired many in the past and by which experience it had been ascertained by trial and error that some things could be done satisfactorily and some other things were usually failures. It would seem that this would be a rather practical and sane course of procedure if reduced to the everyday problem of actually improving the deformity. In other words, mechanical or survey concepts do not belong in biology, genetics, and growing things; and the paraphernalia for making hair-splitting measurements break over the line of practical application in the general field of physical diagnosis. This might also be expressed as the Brash, LeRoy Johnson, C. C. Howard, Detlefsen, Broadbent, Krogman, Hellman, and Mershon concept of the orthodontic field.

Acromegaly is generally regarded as a disease of the pituitary gland in which the bones of the face, hands, and feet enlarge. If a man looked at his hands and feet and found they were beginning to increase in size as a result of bone growth, he would probably realize that he had acromegaly and that the disease had been developing for several years. This same disease affects the mouth and maxillary bones; accordingly, cephalometric concepts in this instance would mean little more in the maxillary bones and teeth than in the bones of the hands and feet so far as diagnosis, prognosis or treatment was concerned. An average normal would mean nothing; but the etiology, the case history, and the histories of previous similar cases would be very important in diagnosis and in trying to ascertain what could be done toward improvement.

The average "run of the mill" men interested in orthodontic problems are more or less bewildered by the continuation of the gnathostatic controversy, for which there seems to be practically no possibility for agreement of opinion. The two schools of diagnostic thought are so widely divergent in the general concept of the orthodontic problem that there is no hope for a reconciliation on a common ground of opinion; they view the picture from entirely different hilltops. The pro-gnathostic believers appeal for the scientific approach to the problem; the other side is opposed to the agitation

in behalf of the canine law and contends that the whole gesture is so hopelessly unscientific in general concept that it only befuddles the entire field of orthodontia, that it builds up a false mental hodgepodge in the approach to the subject that is confusing, particularly to the younger man.

The two approaches are fundamentally widely separated. One school has the yardstick of average normal; the other does not believe that an average normal is within the issues of the problem and does not budge from the biologic viewpoint of the law of variation in living things. Although the average orthodontist is left in a maze of conflicting testimony from which he must necessarily emerge, he must draw his own common sense conclusions and then wait for time to reveal the truth.

One concept is right and one is wrong—that is obvious. Time and experience alone will settle this question, as they do in almost all problems of physical diagnosis in the human being. It is conservative and reasonable to assume that those interested pro and con in the subject will not reach any unanimity of opinion. Gnathostatics, nevertheless, being one among several cephalometric ideas for diagnosis of malocclusion, will no doubt add its contribution to the general consideration of the whole orthodontic problem. Whether the composite idea of craniometric diagnosis and its correlated equipment is important to the everyday problem of correcting malocclusion and retaining the correction, or whether it is not, is a matter of individual opinion; however, it can be said that a broadened viewpoint has resulted from the work and discussions on this subject. It has taught men to look further than oral manifestations alone for diagnosis of malocclusion, and it must be given credit for broadening the diagnostic survey far beyond the planes of the skull and to orient diagnosis in terms of the entire human body, including the fields of biology, pathology, and genetics.

The latter fields have made orthodontists think of the maxillary bones as living, pulsating things, not made of steel and concrete; and that mirror-like, if there is anything wrong in the body, symptoms appears somewhere, and sometimes the symptoms may include malocclusion, as well as large feet and hands or any abnormal skeletal growth.

Whether first molar or the law of the canine—their anatomic position in the skull, relatively, depends largely on hereditary predetermination; and at best either or both are nothing more than shifting corner stones convenient as a base from which to work in this problem, and they are important only to that extent. That relative positions in growing things are not identically the same today as they will be tomorrow is a good fact to remember in the practice of orthodontia.

H. C. P.

An Interesting Letter

IN THE October, 1934, issue of this Journal was published an editorial entitled "Dr. Henry A. Baker and the Baker Anchorage." At that time, the editor had not had the opportunity of reading a letter dated December 16, 1899, which was written to the late Dr. Baker by the late Dr. Angle. This letter will be of

interest to all practicing orthodontists. It is, therefore, published herewith in the editorial pages because of its historical background and as a matter of orthodontic record.

St. Louis, Mo.,
December 16, 1899.

Dr. H. A. Baker,
Boston, Mass.:

Dear Dr. Baker: Your welcome favor of the 1st instant received and in answer to your inquiry as to how I like your method of treating cases of protrusion (meaning Class II, Division 1) will say that I am each day more and more favorably impressed with it. It widens the field of possibilities in orthodontia; there can be no doubt of it. It seems to me, after using it in seven cases, to be the missing link—something I have wanted so long. The chain is complete. We are limited now by our individual skill. The scientific road has been cleared and graded so that orthodontia may now be taught and practised along scientific lines. It is no longer chaotic. Of course I may modify my opinion in regard to your method after more experience, for one swallow or seven don't make a summer, yet I do not think there is even a possibility of my changing my views, for, as I have said, I am more and more impressed each day with its value. I regret I was not a little more pronounced relative to it, in my book, but you know that could hardly be, for only the nearest to *facts* should go in works of that kind.

I wish you would explain how you made the speed you did in the case you report. I cannot conceive of the tissues yielding to that extent in that time.

With best wishes and a Merry Christmas, I am

Your friend,
(Signed) EDWARD H. ANGLE.

H. C. P.

News and Notes

American Society of Orthodontists

The thirty-third annual meeting of the American Society of Orthodontists will be held in New York, April 30, May 1-3, at the Waldorf-Astoria Hotel. Members of the dental and medical professions are invited to attend.

L. M. WAUGH, President,
576 Fifth Avenue,
New York, N. Y.

CLAUDE R. WOOD, Sec'y-Treas.,
Medical Arts Bldg.,
Knoxville, Tenn.

Eastern Association of Graduates of the Angle School of Orthodontia

A regular meeting of the Eastern Association of Graduates of the Angle School of Orthodontia will be held on Monday, January 28, at the Hotel Vanderbilt, New York, N. Y.

E. SANTLEY BUTLER, Secretary,
576 Fifth Avenue,
New York, N. Y.

Dallas Midwinter Dental Clinic

The ninth Dallas Midwinter Dental Clinic will be held February 4-6, at Baylor University School of Dentistry, Dallas, Texas.

The following outstanding clinicians will instruct: Dr. George B. Winter, St. Louis; Dr. Ralph C. Cooley, Houston; Dr. R. O. Schlosser, Chicago; and Dr. Charles A. Sweet, Oakland, Calif.

Members of the dental profession are invited to attend.

For further information address Dr. John R. Swanson, Medical Arts Bldg., Dallas.

Sixteenth General Meeting of the Pacific Coast Society of Orthodontists

The Pacific Coast Society of Orthodontists has changed its date of meeting to February 14, 15, and 16.

A meeting of the Northern Section of the Pacific Coast Society of Orthodontists was held on October 13, 1934, in the Selling Building, Portland, Oregon. Blair Holcomb, M.D., gave a most enlightening talk on "The Effects of Diabetes on the Developing Child," and presented in connection with his remarks a number of children who had been under treatment for diabetes for a period of years. It is interesting to note that a marked tendency toward normal arch development and freedom from caries resulted from the strict regulation of metabolism in connection with the treatment.

L. Howard Smith, M.D., read a paper on "The Development and Care of the Child From Birth to Puberty," emphasizing the nutritional and emotional phases of development, but casting doubt on the permanent effect of childhood perversions.

Both papers were freely discussed by the members present.

As a table clinic, Dr. Paul D. Lewis presented an attachment for anterior teeth, consisting of two parallel round tubes separated by the diameter of the labial wire. A ligature is passed through both tubes and over the wire at either or both ends, thus establishing a firm attachment for alignment of these teeth.

DONALD C. MACEWAN, Secretary.

The Central Section of the Pacific Coast Society of Orthodontists met at the office of Dr. Allen Scott, September 11, 1934.

The meeting was called to order by the Chairman, Dr. Blake, who welcomed Dr. Stryker to the community and his affiliation with the Central Section.

The resolution: "Members of the dental professions not practicing orthodontics exclusively shall not be allowed to attend as guests any meeting of the Central Section of the Pacific Coast Society of Orthodontists" was passed by majority of the members present.

The resolution regarding the reorganization of the American Society of Orthodontists on a national basis, in which the recognized sectional societies become the component societies of the same, as passed by the Southern Section, was adopted in its entirety.

Dr. Leland Carter and Dr. Seymour Winslow, fellow members, gave very interesting clinics on the handling and manipulation of chrome alloys with their welding machines. Dr. C. McCowan also showed some of the work he had done with this material.

J. KESTER DIMENT, Secretary.

The Southern Section of the Pacific Coast Society of Orthodontists met September 5, 1934, in Los Angeles.

The meeting was called to order by Chairman Dr. Fred E. McIntosh, at the University Club.

The resolutions pertaining to mail order orthodontic laboratory appliances which have already been published in the *INTERNATIONAL JOURNAL OF ORTHODONTIA AND DENTISTRY FOR CHILDREN* were unanimously passed.

These resolutions were followed by a talk on "The Orthodontist and the Law," by Mr. Wm. Rains, attorney for the Medical Protective Association. A very interesting general discussion followed.

DR. C. E. THOMPSON, Sec'y-Treas.

Thomas P. Hinman Midwinter Clinic

The Thomas P. Hinman Midwinter Clinic will hold its annual meeting March 18 and 19 at the Biltmore Hotel, Atlanta, Ga.

JOSEPH D. OSBORNE, Sec'y-Treas.,
Doctors Building,
Atlanta, Ga.

Dental Society of the State of New York

The Society will hold its Sixty-Seventh Annual Meeting June 12-15, 1935, at Saranac Inn, Upper Saranac, N. Y.

A cordial invitation is extended to all ethical dentists to attend the sessions.

The following preliminary information is presented:

Dr. H. J. Burkhart, Chairman of Program Committee
Box 879,
Rochester, N. Y.

Dr. L. L. Abbey, Chairman Clinics Committee
619 Union Street,
Schenectady, N. Y.

Dr. H. R. Mead, Chairman Exhibits Committee
619 Union Street,
Schenectady, N. Y.

Further information may be obtained by writing to:

DR. AUGUSTAVE NEUBER, President
619 Union Street,
Schenectady, N. Y.

DR. A. P. BURKHART, Secretary
57 E. Genesee Street,
Auburn, N. Y.

European Orthodontic Society

The European Orthodontic Society will hold its meeting at the Langham Hotel, London, W. 1, on July 29 and 30, 1935, with Dr. Sheldon Friel as its President. Many eminent European orthodontists have signified their intention of being present and reading papers or giving clinics and demonstrations. They look forward to a very interesting meeting, as there is a marked and growing desire to acquire knowledge of this fascinating subject.

The meeting will be immediately followed by the annual meeting of the American Dental Society of Europe, and it is expected the attendance will be a large one. Doubtless, when the final arrangements are made, there will be an exchange of hospitalities between the two societies, which was the arrangement of the last meeting at Scheveningen, The Hague, in May, 1934.

The European Orthodontic Society, by invitation from the Secretary, Mr. G. F. Cale-Matthews, is very eager that co-patriots of America attend this meeting and contribute to the program.

The officers of the European Orthodontic Society at the present time are as follows: President, E. Sheldon Friel, Dublin; Vice President, H. E. March, Bexhill, England; Secretary, G. F. Cale-Matthews, London; Editor and Treasurer, O. Henry, London. Board of Censors: J. T. Quintero, Lyon; F. Stuhl, Paris; E. D. Barrows, London.

Southern Society of Orthodontists

The fourteenth annual meeting of the Southern Society of Orthodontists will be held at the Signal Mountain Hotel, Chattanooga, Tenn., on September 30, October 1 and 2.

Members of the dental and medical professions are cordially invited.

WINSTON P. CAINE, President,
Medical Arts Building,
Chattanooga, Tenn.

WILLIAM P. WOOD, JR., Secretary,
442 W. Lafayette Street,
Tampa, Florida.

Midwinter Meeting of the Chicago Dental Society

The seventy-first annual midwinter meeting of the Chicago Dental Society will be held February 18 to 21, at the Stevens Hotel, Chicago.

Every member of the American Dental Association is cordially invited to attend the meeting.

The American Board of Orthodontia

Created by the American Society of Orthodontists, 1929. Incorporated, January, 1930, State of Illinois, U. S. A.

A meeting of the American Board of Orthodontia will be held at the Waldorf Astoria Hotel, New York, on April 29.

Those orthodontists who desire to qualify for a certificate from the Board should secure the necessary application form from the secretary. The application must be returned to the secretary, together with any other required credentials, at least sixty days prior to date of examination. In order to expedite the examinations the secretary will designate the hour at which the applicant may appear before the Board. Applications filed at the time of Board meeting will have preliminary consideration, so that applicant may be advised of work required for his subsequent examination.

Attention is called to the following resolutions adopted by the Board:

Any person desiring to make application to the Board for a certificate shall have been in the exclusive practice of orthodontia for a period of not less than five years or an equivalent to be determined by the Board and based upon the following conditions:

First. An instructor in orthodontia in a school satisfactory to the Board.

Second. An associate in the office of an orthodontist whose standing is satisfactory to the Board.

It is, however, to be understood definitely that any person at the time of making application for a certificate shall be in the exclusive practice of orthodontia in his own name.

A luncheon or dinner meeting of those orthodontists who have received the certificate of the American Board of Orthodontia will be held some time during the meeting of the American Society of Orthodontists. Members will be notified of the time and place.

ALBERT H. KETCHAM, President,
Republic Building,
Denver, Colorado.
OREN A. OLIVER, Secretary,
Medical Arts Building,
Nashville, Tennessee.

Notes of Interest

The Henry Ford Hospital announces the appointment of Dr. Frank S. Cartwright to the dental staff. Orthodontia exclusively.

Dr. Howard Yost announces the discontinuance of general practice of dentistry and the opening of offices in Grand Island and North Platte, Nebraska, for the practice of orthodontia.

Dr. Arlo M. Dunn announces that Dr. Cecil G. Muller will be associated with him. Practice limited to orthodontia. Offices at 939 Medical Arts Building, Omaha, Neb. Dr. Muller has just returned after a year at the Forsyth Dental Infirmary for Children, Boston, with special work in orthodontics.